AN ATTRIBUTIONAL APPROACH TO COMPUTER PROGRAMMING ACHIEVEMENT OF UNDERGRADUATE BUSINESS COMPUTING STUDENTS IN A UNIVERSITY COMPUTER SCIENCE DEPARTMENT

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ABBREVIATIONS

#	Number of participants
↑	Increased
↓	Decreased
↔	Not affected
%	Percentage
A	High achievement outcome that includes the letter grades A^+, A, or A^-
B	Good achievement outcome that includes the letter grades B^+, B, or B^-
BC	Business Computing
C	Satisfactory achievement outcome that includes the letter grades C^+, or C
CA	Causal attribution
CP1	Computer Programming I
CP1 A	High achievement outcome in CP1
CP1 B	Good achievement outcome in CP1
CP1 C	Satisfactory achievement outcome in CP1
CP1 D	Passing achievement outcome in CP1
CP1 F	Failing achievement outcome in CP1
CP2	Computer Programming II
CP2 A	High achievement outcome in CP2
CP2 B	Good achievement outcome in CP2
CP2 C	Satisfactory achievement outcome in CP2
CP2 D	Passing achievement outcome in CP2
CP2 F	Failing achievement outcome in CP2
CS	Computer Science
D	Passing achievement outcome that includes the letter grades C^-, D^+, or D
F	Failing achievement outcome that includes the letter grades F, or UW
GPA	Grade Point Average
MSU	The name of the university where this study is carried out
NA	Not answered
NP	Not posed
Q	Question
R	Response
UW	Unofficial Withdrawal: counted a failure

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Abstract

Despite the existence of nineteen universities in Lebanon, student motivation and achievement have not received attention in relation to attribution theory by Lebanese researchers. In the present study, attribution theory is used as a conceptual framework for investigating the motivation of undergraduate business computing students at a Mediterranean university based on their academic achievement in an introductory computer programming course.

While numerous studies have used attribution theory as a framework to study student motivation based on hypothetical scenarios or laboratory tasks, this study investigated forty-five male and female business computing students who completed a computer programming course that lasted for a thirteen-week semester. Instead of focusing on either success or failure, the study explored five strata of achievement outcomes. Semi-structured interviews were conducted to obtain students' perceptions.

Some contextual factors such as learning computer programming and Lebanon's socio-political/socio-economic conditions influenced the research findings. The participants made 11 causal attributions for their achievement outcomes. Only two of those 11 causes appeared in the original attribution theory model (Weiner et al. 1971, p.96), but they were amongst those least cited in this study. This study also shows that of the 11 causes, 'lack of study' and 'appropriate learning

strategy' were the leading ones. The latter was cited by all high achievers. While there was total agreement on some of the underlying causal properties of some causal attributions, other causal attributions were perceived differently in the causal space. In addition, there was strong evidence that globality is a fourth dimension in this achievement context. Furthermore, the two dimensions of the Expectancy-Value motivation model did not seem to relate to attribution theory dimensions in this study, especially for low achievers. Finally, it was possible to identify some attribution styles that lead to either success or failure, thus supporting the predictive power of attribution theory.

Key Words

Academic achievement; Motivation; Attribution theory; Undergraduate level

CHAPTER I

INTRODUCTION

Statement of the Problem

Achievement of students is a common worldwide concern of parents, educators, and educational institutions (Cooper 2004, p.1). Educators at the university where this study is carried out (MSU) have that concern too (Rahi 2005, p.19). In particular, the teacher-researcher has long been concerned with motivating students toward maximising their academic achievement in computer programming.

A pressing need to introduce change

The computer science department in the Faculty of Natural Arts and Sciences at MSU (see pp.9-13) launched the business computing (BC) academic programme (see pp.13-5) in the fall 1998 semester. One term after the other, BC students complained about the difficulties they were encountering in learning the fundamentals of programming in the 'Computer Programming 1' course using the programming language C. The C programming language is a hardware-independent widely used programming language launched in 1973 (Deitel and Deitel 2006, pp.8-10). In the spring 2001 semester, the computer science department curriculum committee decided to replace computer language C with Visual Basic. The Visual Basic language supplanted language C for BC students for several reasons including its advanced interface, event-driven programming capability, and intelligent editor.

The researcher as a teacher of CP1 and an advisor to the BC programme

The computer science department hired a teacher, the author of this thesis, to teach in the fall 2001 semester a newly created course, named 'Computer Programming 1' (CP1), using Visual Basic. The teacher had considerable experience in teaching computer programming using Visual Basic. At the time of the study, the course was still taught by the same teacher, but using a newer version of the development tool Visual Basic.NET 2005.

Also, the teacher was appointed as an advisor to the BC programme starting fall 2001. After listening to students' concerns and dealing with them on a daily basis, the advisor and author of this research paper realized that a new approach to teaching them was needed. To understand what keeps many of them from reaching their potential, an educator must consider cognitive factors. These factors include students' perceptions, and interpretations about their achievement (Anderson and Arnoult 1985, p.243). This approach is heavily used by social psychologists (Wilson 1985, p.30). Understanding the psychological and emotional factors enables one to investigate each student individually, to predict future outcomes, and to suggest programmes for motivational change. The research is also carried out by both a teacher of the subject highlighted in the study and an advisor to the academic programme from which the sample was drawn. Thus, it supports the goal of 'decreasing the divide between research and practice in education' (Horner and Gaither 2004, p.165).

The teacher studied and started the implementation of a learner-centred approach. Under the new approach, the classroom climate encouraged students to change from being passive receivers to active constructors of computer programming concepts (Biggs 2003, p.13). For instance, problem-solving sessions were designed to engage the interest of passive students in learning (Bean 1996, p.2). Overall, the course reform was believed to increase the motivation in students to engage in learning computer programming. Application of the new teaching approach took place in a classroom with a video projector, a large screen, and a

computer running the Visual Basic development tool. The teacher felt that the improved teaching environment produced a positive response from students and reduced their frustrations.

However, the teacher's aspirations were soon challenged by some students who remained unmotivated to learn. One semester after the other, the teacher felt dissatisfied with some students' motivation to achieve. Since the course revisions were aimed at engaging all students, the continuing disengagement of some from learning was a perplexing problem (Weiner 1990, p.2). While the teacher confidently continued to use the new teaching approach, concern about students' disengagement from learning and their low achievement was fuelled again. This concern is a prime issue to educational psychologists (Weiner 1990, p.1).

Importance of This Study

Academic achievement and motivation attract the attention of researchers worldwide. Globally, there are numerous studies documenting the relationship between undergraduate students' different types of motivation and their achievement. Some studies have gone beyond the boundaries of one country and studied the similarities and differences across cultures (Hufton et al. 2003, p.367). In Lebanon, research about motivation of undergraduate students studying computer programming is scarce, indeed, most probably non-existent.

Still, academic achievement is a central concern at MSU (Rahi 2005, p.23). Rahi (2005) conducted a study on academic achievement at MSU. His intention was to determine the impact of personal, historical, educational, and social factors on the students' cumulative final score, grade point average (GPA) (Rahi 2005, p.23). The students involved in the study graduated at the end of the academic year 1996 - 1997. None of those students was majoring in BC because the programme was launched later, in the fall 1998 semester. The data was collected by using a

survey questionnaire. The research by Rahi showed that personal and background characteristics had no impact on students' GPAs except for gender (Rahi 2005, pp.272-3). The most important finding of the study was that senior female students outperformed senior male students (Rahi 2005, pp.272-3). In addition, the findings showed that the social and economic aspects did not influence students' achievement (Rahi 2005, p.277). The results of Rahi's work confirm that the problem at hand needs to be examined from a different perspective using other research methods. In fact, Rahi admitted that the issue remained unresolved and called for further research to investigate it (Rahi 2005, p.283).

There is a plethora of literature and research on academic achievement at the undergraduate level (Graunke and Woosley 2005, p.1), but not much on achievement in the domain of computer programming (Phelps and Ellis 2002, p.517). An advanced search was carried out based on the following three databases British Education Index (1979 to March 2007), Australian Education Index (1975 to March 2007), and ERIC (1966 to March 2007) using the search terms 'achievement', 'computer' and 'programming'. The search returned no hits when the search terms were used as descriptors or keywords and just 2 hits when searched for in titles. The first article was published in 1978 by Pohl and Tsai San, and the second article was published in 1988 by Cafolla. In mathematics education, there is enough evidence to support the claim that attribution theory is the 'most widely held' theory of motivation (Middleton and Spanias 1999, p.69). In computer programming, researchers are far from making a similar claim. Research relevant to the study of achievement motivation in computer programming from an attributional perspective is scarce.

This research and its findings will fill in gaps to present knowledge of motivation in the Lebanese context. In this respect, the study might uncover some problems that need further investigation. Most important, the researcher as an educator himself has a special interest in learning more about motivation of his students

(Stake 1995, p.3). As a teacher, he is committed to supporting his students in the successful completion of their computer programming courses.

The study outcomes will be used to suggest ways to energize unmotivated students such as attribution retraining programmes to provide better learning opportunities (Merriam 1998, p.19; Gomm et al. 2000, p.2). Knowledge of causal attributions and their underlying properties at an early stage of a course may help teachers use intervention strategies with students at risk of low achievement, especially those who hold self-defeating attributions. Thus, in computer science department, the present study is crucial to improving teacher effectiveness and student learning.

Although generalization is not a goal in this case study, the findings could challenge assumptions held by people concerned about this case or assumptions held by other people reading the case study. In one way, current assumptions held about BC students by their teachers are generalisations. This case study could provide insight into those generalisations and help in changing the perspectives of those who harbour them (Stake 1995, p.7). People may decide for themselves whether they want to use information from this case study (Hays 2004, p.219).

This research adds several dimensions to the existing body of research on academic achievement and personal motivation from an attributional perspective. First, it is distinguished by the gathering of students' perceptions on their academic achievement instead of from parents, teachers, administrators, or other concerned people. This approach may lead to uncovering whether students ascribe responsibility for success or failure to themselves or to external factors such as the teacher or the curriculum. Second, students' perceptions are responses to an actual, real-life, one semester course from an attributional perspective. In typical attribution research, subjects are provided with hypothetical information and are asked to make attributions (Försterling 2001, p.13; Dresel et al. 2005, p.5). Third, perceptions have been obtained through interview instead of

questionnaire in which subjects are given a traditional set of causal attributions produced by previous research (Birenbaum and Kraemer 1995, p.347; Bornholt and Möller 2003, p.221). Interviews are used as a primary mode of data-collection to obtain rich and detailed pictures of students' experiences (Stake 1995, p.64; Kvale 1996, p.3) and to shed light on their individual differences. Fourth, it focuses on a computer programming course taught using a learner-centred approach. Fifth, the study takes place in Lebanon, a troubled and shattered country that lacks research on the topic. Finally, the researcher is himself the teacher of the computer programming course and the academic advisor of the undergraduate BC cohort.

Naturally, the research will not produce study findings that involve students in every computer programming class working with equal intensity. Nevertheless, it is believed that the findings will strengthen our theoretical knowledge of attribution theory as well as help in promoting academic achievement of the BC cohort in informed ways. Next, the research aims and objectives are stated.

Research Objectives

The purpose of this research is to investigate the influence of causal attributions on the motivation of BC students in computer programming in the computer science department at a Christian Mediterranean university.

The list below includes the objectives of the research. Carrying out those objectives during the research will be governed by the researcher's moral principles and code of conduct in life.

1. To develop some knowledge of motivation in learning computer programming from an attributional perspective at the undergraduate level in a Lebanese setting.

2. To identify the causal attributions of students learning computer programming and how students come to identify them.

3. To identify how students from various strata of achievement outcomes perceive the underlying properties of causal attributions and the influence they have on motivation for learning any similar subject.

4. To verify whether the causal dimensions of attribution theory map well with the determinants of the Expectancy-Value motivation model as proposed by the original attribution theory model.

5. To fill in a gap in the existing body of knowledge concerning the motivation of students learning computer programming.

Scope of the Study

A case study method is appropriate because "how" or "why" questions are being posed 'about a contemporary set of events, over which the investigator has little or no control' (Yin 2003, p.9). It is distinguished by several unique characteristics. It is embedded in the BC programme. Applicants have been accepted based on an open admissions policy which has led to the enrolment of students from diverse school backgrounds (see p.13). Applicants sit for English and mathematics entrance exams. While the English entrance exam requirement is the same for all faculties, the mathematics entrance exam is specific to each academic programme. Students take a sequence of unique computer programming courses in addition to business courses. Another distinguishing factor is the replacement of the current software development tool immediately after receiving the latest release in the international market. In addition, teaching and learning computer programming in this context is based on using language that is projected on a big screen and on using a learner-centred approach. For all

the reasons cited above, the cohort has a unique academic life at MSU. Thus, this study has a distinct advantage of being a case study (Gerring 2007, p.17).

This case study employs two methods of gathering data, interviews and the examination of students' records. Employing more than one data-collection method in a research study has been gaining ground (Clarke 1999, p.86; Bryman 2004, p.49). It is a distinctive aspect of case study research (Eisenhardt 2006, p.300). In this case study, the first step in the research design is the gathering of qualitative data through interviews. Interview is the best method to discover from participants their views, explanations, interpretations, and emotions (Stake 1995, p.64). Administration of interviews is expected to turn into a rich source of individualities and commonalities related to learning motivation that affects students' academic achievement (Anderson 1998, p.155; Hays 2004, p.229). The interview section will present the choices that shaped the interview method of this study. Interviews will be rehearsed through a pilot study to test the research questions and to determine the time that should be allotted for them.

One of the study's objectives is to understand well enough only the case under focus. There is no intention of gathering data beyond its boundaries (Hays 2004, p.232). The clarity of the research purpose helps in gathering relevant information about every participant (Stake 1995, p.133; Yin 2003, p.23). Participants' views are essential to the study and cannot be dismissed even though they are collected from a sample. The uniqueness each participant brings into the study may pave the way for new leads.

Students' motivation is deeply rooted in context which is intertwined with political, social, and economic issues (Stake 1995, p.17) that have been affecting Lebanon. A country shattered by three wars in the last three decades. In other contexts, research showed differing results. While some research showed that students attributed their high achievement to ability, other research showed that

they attributed it to effort (Bempechat et al. 1996, p.54). Next, a brief description of the history and location of the University is presented.

History and Location of the University

Currently, there are 19 universities operating in Lebanon. The oldest university is the American University of Beirut which was founded in 1866. It offers a liberal education. The Lebanese state university was founded in 1967 comprising faculties of law, medicine, arts, and science. Lebanon is a country where three languages are commonly spoken. That is why there are universities and schools that teach in Arabic, English, and French. Out of 19 universities, there are 9 English-medium universities, 3 Arabic-medium universities, 3 French-medium universities, and 4 bilingual or trilingual universities. Students have a wide variety of universities where they can choose to study when one of the factors is their preferred language of instruction. Almost all universities have common entry qualifications to the sophomore year class. For example, all Lebanese applicants must have the Lebanese Baccalaureate Part II and they should sit for English, mathematics, and/or sciences entrance exams.

MSU is a non-profit Lebanese Catholic institution of higher education which follows the American system of education (MSU 2003, p.5). It was founded in 1987 in northeast Beirut, the capital city of Lebanon. The site of this study is the University's main campus which is located in a town whose 60,000 residents are mainly Christians. The area of the land where the main campus is located consists of about one million square meters (MSU 2003, p.13). MSU encompasses two additional branches, one in the North of Lebanon inaugurated in 1990, and another in the Shouf area inaugurated in 2001. A nursing school was launched in the fall 2006 semester. Some additions at the main campus have been completed and others are under construction to accommodate an increasing student population.

The main campus' parking areas capacity is about 1000 cars. The University facilities include a Student Hall, faculty residences, and dormitories for about 500 students. Also, facilities include a church with a capacity of 1,000 people, research centres, counselling and health services, engineering and science laboratories, a photography laboratory, a ceramic atelier, a metal and wood workshop, a radio/television studio, a projection room, a museum, a theatre for 1,000 persons, a restaurant, a coffee bar, a bookstore, a library, and recreation facilities. Conferences and concerts are held in a hall that can seat 400 persons fully equipped with sound and lighting facilities including translation services in up to four languages simultaneously. The University campus encompasses fully equipped courts for Tennis and Basketball. The plan for a sports city is underway including a swimming pool, a football pitch, and a lake for water games and canoeing (MSU 2007a, pp.47-59).

MSU had students of 40 different nationalities in the spring 2007 semester (see Table 1.1, p.11). Its population reached 4780 students in the fall 2006 semester of which 4062 were registered on the main campus. The majority of students were Lebanese. Americans, Canadians, Palestinians, French, Australians, British, Ghanaian, and Syrians followed, in that order.

Table 1.2, p.12, depicts the size of the first 9 universities in Lebanon for the academic year 2005-2006. The Lebanese University attracted the highest number of students and it was the only one to attract more females than males. While females formed 65.2% of the total population at the Lebanese University, females formed 36% of the population at the university under focus.

Table 1.1: Distribution of Students in MSU by Nationality in Spring 2007

Count	Nationality	Students	Percentage
1	LEBANESE	3751	95.03
2	AMERICAN	31	0.79
3	CANADIAN	26	0.66
4	PALESTINIAN	16	0.41
5	FRENCH	14	0.35
6	AUSTRALIAN	12	0.30
7	BRITISH	9	0.23
8	GHANAIAN	9	0.23
9	SYRIAN	9	0.23
10	EGYPTIAN	6	0.15
11	GREEK	6	0.15
12	JORDANIAN	6	0.15
13	BRAZILIAN	5	0.13
14	SAUDI ARABIAN	5	0.13
15	GAMBIAN	4	0.10
16	IRAQI	4	0.10
17	COLOMBIAN	3	0.08
18	CYPRIOT	3	0.08
19	BELIZEAN	2	0.05
20	ITALIAN	2	0.05
21	NIGERIAN	2	0.05
22	RUSSIAN	2	0.05
23	SIERRA LEONEAN	2	0.05
24	SOUTH AFRICAN	2	0.05
25	AFRICAN	1	0.03
26	Antiguan & Barbudan	1	0.03
27	ARGENTINEAN	1	0.03
28	BELGIAN	1	0.03
29	BULGARIAN	1	0.03
30	COSTA RICAN	1	0.03
31	CZECHOSLOVAKIAN	1	0.03
32	DANISH	1	0.03
33	GERMAN	1	0.03
34	POLISH	1	0.03
35	QATARIAN	1	0.03
36	SENEGALESE	1	0.03
37	SPANISH	1	0.03
38	SWEDE	1	0.03
39	TRINIDADIAN	1	0.03
40	VENEZUELAN	1	0.03
	Total	**3947**	**100.00**

Table 1.2: Distribution of Students in Universities Operating in Lebanon by Sex and Nationality for the Academic Year 2005-2006

University / Sex & Nationality	Sex			Nationality		
	Males	Females	Total	Lebanese	Non- Lebanese	Total
Lebanese University	24594	46033	**70627**	68254	2373	**70627**
Beirut Arab University	8204	5449	**13653**	7511	6142	**13653**
Université Saint-Joseph	3595	6123	**9718**	9238	480	**9718**
American University of Beirut	3574	3370	**6944**	5637	1307	**6944**
Université Saint-Esprit de Kaslik	3069	2880	**5949**	5705	244	**5949**
Lebanese International University	2873	1849	**4722**	4447	275	**4722**
MSU	2996	1681	**4677**	4525	152	**4677**
Lebanese American University	2589	1980	**4569**	3659	910	**4569**
Balamand University	1605	1208	**2813**	2580	233	**2813**
10 other universities	6815	4134	**10949**	9823	1126	**10949**
Total	59914	74707	**134621**	121379	13242	**134621**

Source: CERD (2005-2006).

The year 2007 marked the 20th anniversary of MSU and the 300th anniversary of the monastery that founded the University. MSU does not impose any sectarian obligations on faculty members, staff or students. It is committed to advancing academic excellence, expanding liberal and professional knowledge, creating a diverse and inclusive community and preparing leaders dedicated to ethical conduct and compassionate service. As a Catholic university, it is dedicated to the following core values: faith, excellence, scholarship, freedom, integrity, service, diversity, and learning for life. MSU 'complies with all applicable nondiscrimination laws and does not engage in prohibited discrimination based on race, color, national or ethnic origin, sex, age, or disability' (MSU 2007b, p.9). The BC students' cohort is part of the computer science department in the Faculty of Natural Arts and Sciences. This study is carried out about 8 years after the establishment of the BC programme.

The Business Computing Programme

Since its launch in 1998, the programme has been offered to students with varying abilities and secondary school background. To be eligible for the sophomore year, applicants to the BC programme must hold Lebanese Baccalaureate Part II in any strand (General Sciences, Literature and Humanities, Social Sciences and Economics, Life Sciences) or the equivalent delivered by the national Commission for Equivalence at the Lebanese Ministry of Education and Higher Studies. All other programmes in the computer science department do not accept students that followed the Literature and Humanities strand. The phrase 'the equivalent' allows students who earned a technical baccalaureate degree, or who successfully completed the freshman sciences or freshman arts year to register. Freshman sciences and freshman arts could be non-Lebanese or Lebanese who followed a high school programme. Furthermore, transfer students flow into the BC programme from academic programmes within the computer

science department, from other faculties within the same university, and from other universities.

All applicants are required to sit for an English Entrance Test (EET) that is structured and administered by the University or TOEFL, and a Mathematics Test. A student has to pass the EET with a minimum score of 700 in order to be exempt from remedial English courses, and a minimum score of 400 in order to be accepted with remedial English courses. A student has to pass the TOEFL with a minimum score of 250 (computer-based) or 600 (paper-based) or 100 (internet-based) in order to be exempt from remedial English courses, and a minimum score of 213 (computer-based) or 550 (paper-based) or [79-80] (internet-based) in order to be accepted with remedial English courses. Applicants with an overall average of at least 14/20 on the Official Baccalaureate Exam are exempt from the Mathematics test. There is a widespread belief that universities in Lebanon are highly selective (El-Amin 2004, p.212).

Table 1.3 below depicts the total of BC students by gender in all universities operating in Lebanon.

Table 1.3: Number of Business Computing Students by Sex and Academic Year from 2002 to 2006

Academic Year	Males	Females	Total
2002 – 2003	910	453	1363
2003 – 2004	1390	603	1993
2004 – 2005	1650	573	2223
2005 – 2006	1371	432	1803

Source: Based on figures from CERD (2002-2006).

Information about the academic years 2001-2002 and beyond 2005-2006 was not available.

Description of the course followed by students investigated in this study

The name of the course under focus is 'Computer Programming 1'. It is designed to introduce students to computer programming using a leading-edge development tool. In the fall 2006 semester, the course content was updated based on Microsoft's latest release Visual Basic.NET 2005 from Visual Basic.NET 2003. Topics include problem-solving using computers, interface design, event-driven programming, form and control properties, Exception Handling, algorithms, variables, assignment statements, data types, data input and output, arithmetic expressions, memory concepts, structured programming, methods, functions, modules, selection structures, repetition structures, arrays, enumerations, structures, collections and lists, hash tables, advanced array manipulation, and object-based programming. Computer programming is a subject area that requires lots of abstraction, logic, non-stop learning of new concepts and syntax, and editing and keyboarding skills.

Context of the Study

Lebanon is situated on the eastern most part of the Mediterranean Sea. It lies west of Syria and north of Israel. Geographically, Lebanon links three continents: Europe, Asia, and Africa. Its total area is 10,452 square kilometres. It is a mountainous country with two parallel ranges of mountains running north to south. The highest altitude is 3,088 meters. Between the two mountain ranges lies the Bekaa Valley, the principal agricultural area. Two main rivers flow out of it. Lebanon's climate is distinguished with four equally distributed seasons throughout the year. In winter, snow falls on mountains above 700 meters. In summer, areas on the coast become humid and hot. This climate has always attracted tourists from all continents (El-Hafez 2004, p.135). The history of

Lebanon dates back over six thousand years to the Phoenicians. Lebanon has a rich cultural heritage because it is a contact centre between various cultures and civilizations which attracted a great deal of tourism.

The population was 3,921,278 in 2007. It was composed of Muslims (60%), Christians (39%), and minorities (1%). It is Arabic- (official) speaking, with English, French, and Armenian widely used. The population has been subject to several exoduses throughout its history. The last started in 1975 and still continuing to date. The main cities are Beirut, the capital, Tripoli, Sidon, and Jounieh. About one third of the population lives in the capital and its suburbs.

Lebanon has continually been faced with multi-faceted political, economic, and social crisis. From 1516 to 1918, Lebanon was under the political sovereignty of the Ottoman Empire. In fact, Lebanon formed a single political unit with Syria then. In 1920, General Gouraud, the head of the French troops, declared Lebanon a state called “Grand-Liban” where Maronite Christians were then dominant.

An agreement known as the National Pact led to political independence from the French Mandate on November 21, 1941. The Maronite community agreed to stop their reliance on and support from the West, and Sunnis approved Lebanon as a state neutral towards the Arab world (Najem 2000, p.8). Lebanon was declared a democratic republic with a parliamentary system of government. The evacuation of French troops was completed in 1946. Gradually, Lebanon transformed into the cultural, academic, and medical centre of the region.

CHAPTER II

LITERATURE REVIEW

Introduction

This chapter is an investigation of the theory and a review of the research literature on motivation and its influence on academic achievement from an attributional perspective. The gained knowledge is the building block towards achieving the purpose of this research which is to study the motivation of business computing students from an attributional perspective to understand their achievement outcomes in an introductory computer programming course. The first section begins with a focus on motivation followed by an overview of attribution theory. Then, the development of attribution theory is discussed, starting with its originator Fritz Heider (1958), passing through its earliest embracement by achievement theorists, and ending with its current state as it was presented by Weiner (2000). This theoretical literature is used as a conceptual framework for examining academic motivation of business computing students at the undergraduate level in a Mediterranean university. While presenting the work of attribution theory authors, this study engages with recent research on motivation from an attributional perspective in educational settings. The aim is to show how the existing body of research in the area of interest relates to the knowledge base reviewed.

Attribution Theory and Motivation

Knowledge about motivation is extensive. This section presents knowledge about motivation just from an attributional perspective. Attribution theory emphasises

cognitive processes (Middleton and Spanias 1999, p.69) and emotions that influence academic achievement (Petri and Govern 2004, p.342). This is in tune with the widespread interest in cognitive concepts. In fact, cognition is one of the major sources of attribution theory popularity. Attribution theory helps in understanding the role of motivation in the success or failure of learners (Berliner 2006). The inclusion of successful as well as failing students is an important aspect of motivation research. However, many studies on motivation and academic performance from a non-attributional perspective have focused on low-achievers only (Griffin 2006, p.1). The subsequent knowledge base underpins the work accomplished in this study.

What is motivation?

Motivation is the reason that guides people to behave the way they do (Graham and Weiner 1996, p.63; Santrock 2001, p.394). In 1964, Atkinson asserted that 'the theory of achievement motivation attempts to account for the determinants of the direction, magnitude, and persistence of behaviour' (Atkinson 1964, p.240). Child (1997, p.45) asserts that the study of motivated behaviour includes obvious movement as well as mental action. While there is much disagreement on the motivation concept, researchers agree that it comprises direction and magnitude of behaviour (Dörnyei 2001, p.9). The most frequent descriptors used to describe a motivated behaviour remain: activated, directed, energized, intense, and sustained (Alderman 2008, pp.4-5). Nonetheless, cognitions and emotions that guide behaviour became under focus too (Graham and Weiner 1996, p.63). Parents, teachers, educationalists, and psychologists have been trying to understand why students achieve the way they do, what gets students engaged in learning, why they select one course of action over another, and why they persist toward their goals (Bentham 2002, p.120; Griffin 2006, p.2). These motivation-related questions have been addressed by educators from different perspectives.

Motivation has been explained from three broad perspectives: behavioural, humanistic, and cognitive (Santrock 2001, p.394). The move from behavioural

and humanistic perspectives to cognitivism was due to a major change of emphasis in motivational models away from constructs such as drives, processes such as reinforcement, and subconscious motives (Locke and Latham 1994, pp.13-4) toward individuals' cognitive representations (Graham and Weiner 1996, p.66; Molden and Dweck 2000, p.132). Motivational research shifted its emphasis to the cognitive perspective on motivation (Weiner 1990, p.5). This historical shift resulted from the cognitive theorists' belief that human thinking affects motivation (Child 1997, p.50). Consequently, a principal research tradition has been established to investigate human mental processes that produce motivation and subsequent behaviour (Dörnyei 2001, p.19).

Researchers started studying individuals' perceived reasons for their successes and failures (Middleton and Spanias 1999, p.69). They became convinced that people rely on cognitive processes to understand why they achieve as they do and to predict future behaviour (Goethals 2003, p.14-5). The advancement of cognitivism resulted from the contributions of individual differences in motivation. Theorists and researchers extended their interest to include people's thoughts, beliefs, and emotions. Consequently, research on success and failure, and motivation surged rapidly during the last three decades (Graham and Weiner 1996, p.66; Santrock 2001, p.396; Wigfield and Eccles 2002, p.1). Grand motivation theories such as drive, achievement motivation, and social learning have been surpassed by narrower theoretical conceptions (Graham and Weiner 1996, p.66; Alderman 2008, p.5). The main theoretical conceptions that are based on cognition are: causal attributions, self-efficacy, learned helplessness, thoughts about goals, self-worth, and intrinsic motivation (Alderman 2008, p.6). This study is concerned with understanding students' perceptions of their own past successes and failures. Since attribution theory is believed to be a theory of motivation that can help us better understand causal attributions of past events and subsequent actions of students who make them (Martin 2002, p.37), an extensive review of it follows.

Attribution theory overview

This section is a review of some of the theoretical work done in attribution theory. People need to understand the happenings in their world. Attribution theory is about how people form mental construals about those happenings and how those mental construals in turn influence emotion, motivation, and future behaviour. Attribution emerged, developed, and turned into a vital area in social psychology (Försterling 2001, p.8). Attribution theory is based on the assumption that people are intuitive scientists who actively seek to understand themselves and their environment (Santrock 2001, p.401; Elliott et al. 2005, p.17) which often leads to forming causal attributions (Graham and Weiner 1996, p.71). According to Weiner, action stems from a search for understanding (Weiner 1982, p.164). This theory explores cognitive processes that people use in determining the causes of events (Seifert 2004, p.138) and in influencing subsequent behaviour (Berliner 2006; Alderman 2008, p.27). The term attribution is used in reference to 'the explanations for behaviour that people come up with' (Kassin 2006). In an academic achievement context, a succinct definition of an attribution is: a perceived cause of success or failure (Santrock 2001, p.401; Schunk 2001, p.132).

The continued interest in attribution is fuelled by the idea that people's perceptions of their past achievement influence their performance and emotional reactions to future tasks (Maag 2004, p.364-5). This theory helps in understanding people's perceptions of the causes of behaviours' outcomes (Schultz and Oskamp 2000, p.42). By understanding attributions, attribution theorists believe that they can predict and control not only behaviours of people but events of environments too (Elliott et al. 2005, p.17). That belief stems from the assumption that attributions influence people's actions and their outcomes (Jones 2001, p.34). The word 'people' refers to every one who is capable of making attributions. Some research examined causal attributions of children, starting with 4th or 5th graders (Bempechat et al. 1996, p.54; Lloyd, Walsh, and Yailagh 2005, pp.400-2). People's actions include behaviours, attitudes, and

emotional reactions towards themselves or others (Anderson and Arnoult 1985, p.244). Attribution theory is defined succinctly by Beck (2004, p.331) as follows:

> 'Attribution theory is concerned with (1) how and why people search for the causes of their own behaviour or that of other people, (2) the kinds of causes that are found, and (3) the effects of such attributions on emotion, motivation, and subsequent behaviors'

The originator of the attributional approach in social psychology is Fritz Heider (Berscheid 2001, p.25). He was a modern social psychologist who opposed the behavioural perspective in psychology (Frieze and Bar-Tal 1979, p.7). Behaviourists excluded cognitions from their research. They thought that cognitions cannot be studied since they cannot be observed (Försterling 2001, p.10). Despite the behaviourists' stance, Heider focused on the causes that people ascribe to action outcome (Alderman 2008, p.28). Though attribution theory developed as a field of social psychology, it received special attention from achievement motivation researchers because it brought in a new dimension to their studies. That is, to understand success and failure or achievement strivings, achievement motivation researchers can depend on determining people's own attributions about why they achieve the way they do. Weiner (1990, p.5) related his seminal work to mainly the 'shift in psychology away from mechanism and toward cognition.' Many theorists agree that people are intuitive psychologists capable of learning about their own behaviour and the environment (Weiner 1995, p.268). From an attributional perspective, motivation is seen as a 'temporal process initiated with an event and ending with some behaviour or behavioural intention' (Graham and Weiner 1996, p.71). Motivation changes over time (Dörnyei 2001, p.41). Early achievement motivation researchers such as Feather (1967), de Charms (1968), and Weiner (1972) contributed to the advancement of attribution theory (Frieze and Bar-Tal 1979, p.3), but the major contributions came from the latter, especially in 1986 (Försterling 2001, p.109). Next, the main aspects of early attribution theory are defined and discussed.

Main aspects of early attribution theory

Fritz Heider sketched the original outline of contemporary attribution theory (Jones 2001, p.35). Heider's (1958) writings had a strong effect on the creativity of social psychologists, achievement motivation theorists, and researchers (Goethals 2003, p.13). In particular, they served as the foundation for later developments in the field of education (Weiner 1972, p.203). Heider defined attribution as 'the linking of an event with its underlying conditions' (Heider 1958, p.89). He focused on cognitions that people form about actions resulting from relationships between people (Goethals 2003, p.13). Still, he posited that the concepts in the naïve analysis of action 'also apply to one's own actions' (Heider 1958, p.79). Jones (2001, p.34) agrees with Heider's view that attribution theory concerns explaining causes pertaining to self and to others. Heider's main proposition was that the interest in observable facts about behaviour should expand to include the cognition causing that behaviour (Berscheid 2001, p.24). The investigation of cognition turned out to be the most important step in attribution theory (Försterling 2001, p.10). The first step then entails the search for a cause to an action outcome.

For Heider, naïve persons tend to search for the underlying causes not out of mere curiosity, but to give meaning to behaviour (Petri and Govern 2004, p.318). This fundamental view has been embraced by many theorists and researchers (Jones 2001, p.34). Meaning given to behaviour is vital for predicting future actions and controlling them (Försterling 2001, p.11; Trope & Gaunt 2003, p.190). Decades later, researchers remain hopeful that the understanding of peoples' perceptions could lead to predicting and controlling their future responses (Phelps and Ellis 2002, p.517).

The second step entails interpreting and describing the causes of action outcomes. Heider wrote that an action outcome depends on the contribution of personal forces and environmental forces (Beck 2004, p.331; Petri and Govern 2004, p.318). This belief is in accordance with 'the assumption of scientific

psychology, which also assumes that behaviour is a function of the person and the environment' (Försterling 2001, p.23). The distinction between factors within the person and factors outside the person within the environment proved to be an essential point in the attribution history (Goethals 2003, p.13). Furthermore, environmental factors were characterised by Heider as either permanent such as difficulty level of a task or temporary such as opportunity and luck (Försterling 2001, p.23). Difficulty as a permanent characteristic of task helps people predict future action outcomes (Heider 1958, pp.89-90). Also, personal factors can be characterised as either permanent such as ability or temporary such as fatigue and mood. When failure is ascribed to a transient personal state, most likely the person will not be seen as unable to do the task (Heider 1958, p.95). Heider shows that the analysis of a cause may lead to predicting the outcome of a future task (Försterling 2001, p.26). The distinction between permanent and temporary factors is later replaced by theorists with stable versus unstable factors.

Heider believed that personal causality is restricted to intentional actions (Malle 2004, p.16). An action is intentional when its outcome is the doer's goal, whether consciously or unconsciously (Heider 1958, p.100). Actions due to pressure or chance are not indicative of the person's character and can not be used as a basis to make predictions about future tasks (Försterling 2001, p.33). According to Heider, to determine whether an outcome is produced intentionally, one can observe the action or ask the person himself (Heider 1958, p.115; de Charms 1968, p.302).

Attribution theory continued to flourish through influential writings of Jones and Davis (1965) and Kelly (1967) (Berscheid 2001, p.25). In 1965, Jones and Davis wrote a paper 'From Acts to Dispositions: The Attribution Process in Person Perception' about the perception of intention. Jones and Davis' (1965) work built on Heider's book 'The Psychology of Interpersonal Relationships' (Goethals 2003, p.13), but moved away from causal attributions to a theory of trait inferences (Malle 2004, p.13) known as correspondent inferences (Goethals

2003, p.13). A correspondent inference is made to relate an action outcome to a personal disposition such as ability only when the person is free to do that action (Jones 2001, p.35; Petri and Govern 2004, p.320). Whenever an action outcome is attributed to environmental explanations such as social norms, a correspondent inference cannot be made (Goethals 2003, p.13). Jones and Davis's (1965) work focused only on attributions about others' actions (Försterling 2001, p.35; Petri and Govern 2004, p.321). However, Jones (2001, p.34) asserts later that attribution theory concerns explaining causes pertaining to self and to others. The main critique of the correspondent inference perspective is that it did not interest researchers (Petri and Govern 2004, p.321).

In 1967, Kelley contributed to attribution theory (Graham and Weiner 1996, p.71) through a cogent paper 'Attribution in Social Psychology'. Kelly's goal was to emphasise Heider's ideas specifically that in the attribution process the choice is between external and internal causes and that causal inferences are arrived at by experiment-like variations (Kelly 1967, p.194; Petri and Govern 2004, p.321). Jones (2001, p.35) believes that Kelly's theory of entity attribution was the complement of Davis and his. Whenever an action outcome can be attributed to an external cause, internal causes should be discounted (Goethals 2003, p.14). Kelly based his line of thought on the assumption that people want to understand the causal structures of the world around them to ensure success in future tasks (Beck 2004, p.331). Some authors see Kelly's model of attribution as problematic. The first reason is that the internal-external dimension does not lead to gaining people's perceptions of intentional actions (Malle 2004, p.19). The other reason is that people do not only use experiment-like variations of conditions to give explanations to actions (Malle 2004, p.19).

The above discussion is a strong evidence of attribution researchers' commitment to contribute to attribution theory from the time of Heider's early contributions. The interest in Heider's work is owed to Jones, Davis, and Kelly (Försterling 2001, p.8). Since then, attribution theory has generated a tremendous amount of

research (Goethals 2003, p.14). Berscheid (2001, p.25) refers to that research to defend her belief about what she calls the 'cumulative nature' of attribution theory. In the forthcoming sections, this cumulative nature becomes clearer. Next, the major developments in attribution theory are presented and discussed.

Major developments in attribution theory

The application of attribution theory expanded to disparate topics (Petri and Govern 2004, p.323) such as mental and physical health (Schultz and Oskamp 2000, p.42), depression (Goethals 2003, p.14), education (Försterling 2001, p.8), athletics (Arndt and Goldenberg 2002, pp.54-5), mathematics education (Bempechat et al. 1996, p.53; Middleton and Spanias 1999, p.69), science education (Allen and Dietrich 1991, p.3), music education (Legette 1998, p.102), and attention-deficit/hyperactivity disorder (Johnston and Lee 2005, p.314). In education, research on attributions was mostly conducted in the area of mathematics (Lloyd, Walsh, and Yailagh 2005, p.386). Nevertheless, research investigated children, adolescents, and college students (Mitchell and Hirom 2002, p.2). The spread of attribution theory across many fields is partially due to the interest in studying motivation. Elliott et al. (2005, p.17) reported that attribution theory has spread through the literature on educational performance on a large scale, especially in the achievement motivation field. Still, the extensive amount of research that used attribution theory produced challenges to the theory.

People seek causes to account for their successes and failures (Graham and Weiner 1996, p.71). Causes of success and failure may be seen differently by different students. Consequently, students who attribute different reasons to success and failure may respond differently in future tasks. People working in achievement contexts need to know, for instance, why after failure some students try harder, whereas others give up. Such questions indicate that there are many plausible causes of success and failure. Attribution theory is thought to have the capability of explaining why people respond in different ways to success and failure (Horner and Gaither 2004, p.166).

In 1971, Weiner et al. wrote a paper that presented an attributional model of motivation in achievement contexts (Weiner et al. 1971, p.96) greatly influenced by the insights of Heider (1958). Beside the use of attributional ideas of Heider, they added strength to their model by incorporating cognitive conceptions of motivation developed principally by Atkinson (1957) (Weiner et al. 1971, p.102). At times, two opposing camps were prevalent in motivation labelled as mechanistic and cognitive. The model assumes that causal attributions of success and failure mediate between stimulus and response (Weiner et al. 1971, p.96). In addition, it focuses on both attributions of success and failure about self and others (Weiner 1979, p.15). Most research using attribution theory has also focused on self-attributions (Olson and Ross 1985, pp.294-5). Examples of stimulus and response are course final grade and changing academic major respectively.

Weiner (1985) introduced a major enhancement to the original model which will be illustrated in the following sections. Those enhancements made him the major contributor to the attribution theory of achievement motivation to the extent that many authors refer to it as Weiner's attribution model (Dörnyei 2001, p.22). According to Weiner, attributional inferences guide the motivational process which culminates in a behavioural outcome (Weiner 2000, p.2). Attributional inferences act as a bridge between success or failure and the student's response. It is the interpretation of a grade as a success or failure that triggers the motivational sequence. Attributional inferences of a particular student follow one of multiple pathways and guide motivation to a specific behavioural consequence.

Motivation in achievement contexts is envisaged as a temporal process invoked by an event such as the receipt of a course final grade. Then, motivation serves as a spur to behaviour. The attribution theory emphasises the roles of cognition processes, self, and environment beside the social nature of motivation in

education and its two determinants expectancy and value. The two determinants are identified by research as the value of the task to people and their expectancy of success at it (Arnone 2005, p.4; Elliott et al. 2005, p.25). Martin (2002) asserts that the interaction of students' 'expectations and their valuing of a given task predict their motivation on it' (Martin 2002, p.38). Weiner (1979) complemented and completed his original model with ideas from the expectancy-value perspective of motivation (Weiner 1979, p.8; Petri and Govern 2004, p.323). Dörnyei (2001, p.21) posits that 'attributional processes form one of the most important influences on the formation of people's expectancies.' Furthermore, the expectancy construct turned into the 'most important development in social cognition theory applied to education' (Child 1997, p.68). Attributional theory amalgamates those areas and forms a central core of motivation for success and failure. About three decades after writing his first paper on attribution theory, Weiner expressed his conviction that attribution theory had been a prominent theory in many research areas including motivation and educational psychology (Weiner 2000, p.1). In year 2000, Weiner arrived at an amended state of attribution theory to handle the challenges posed by research applications on real contexts. Next, the new state of attribution theory is presented with a strong emphasis on how it developed historically.

Instigation of attributional processes

What launches attributions is the occurrence of an outcome (Molden and Dweck 2000, p.143). However, not every outcome instigates attributional processes. For instance, failure in computer programming does not trigger attributional search in students who believe they have lack of ability. Expected action outcomes do not trigger attributions (Försterling 2001, p.15). There are some characteristics of action outcome that determine whether or not a causal attribution will be made. Several studies show that attributional processes are triggered when the action outcome is unexpected, negative (Santrock 2001, p.401), concrete, important, and unusual (Anderson and Arnoult 1985, p.244). A failing grade received by a student expecting success in a course instigates attributional processes (Graham

and Weiner 1996, p.71). The failing grade contradicts a pre-existing schema related to the student's achievement. The pre-existing schema has guided the student's behaviour prior to receiving the grade. The concerned student starts a causal search upon the receipt of the failing grade to understand what happened and to revise the pre-existing schema (Försterling 2001, p.16).

Weiner (2000, p.2) adopted three characteristics of action outcome that lead students to make attributions: negative, unexpected, and important. In addition, Weiner contends that it could be a combination of any two or three of those characteristics that instigate attributional processes. Weiner suggests that success when it is expected is an example of when causal inferences are not activated. Nevertheless, some research showed that not only particular characteristics of action outcome instigate attributional processes, but the motivation to control behaviour or the environment plays a role too (Försterling 2001, pp.102-3). Pittman and D'Agostino (1985, p.138) argue that the higher the 'control motivation' of a person, the higher the possibility to make causal attributions.

Appraisal of an outcome

The receipt of a grade triggers an immediate emotional reaction of either happiness or sadness (Schultz and Oskamp 2000, p.43; Weiner 2000, p.2). Success in a course triggers happiness, whereas failure triggers sadness. Although the previous example is common sense, it shows that the emotional reactions were a consequence of the outcome itself (Weiner 1986, p.121). Sometime after the triggering of the initial emotional state, the characteristics of action outcome may drive the student to start a causal search to understand what caused the course letter grade (Seifert 2004, p.138). The search ends with the selection of at least one cause such as ability, effort, or luck. Once an attribution is conjured up in the mind, more emotions are activated by the causes of the outcome that may possibly be different from the emotions that were triggered by direct perception of the outcome (Beck 2004, pp.333-4). For example, if a computer programming course is failed, the student may attribute failure to lack of effort, lack of ability,

poor instruction, bad luck or a variety of these or other factors (Schultz and Oskamp 2000, p.43). Thus, there are two types of appraisals, one that depends on the outcome and another that depends on the causal attribution (Anderson and Arnoult 1985, p.247). Causal attributions are examined thoroughly in the following sections.

Causal attributions

It is important to find the causes that students ascribe to an achievement outcome, such as passing or failing a course, because those causes play a major role in moulding future expectancies and emotions of learners that is their motivational states that in turn determine their achievement strivings (Griffin 2006, p.3). Perceived causes of achievement outcome may not be congruent with the actual causes (Latu 2004, p.344; Weiner 2006, p.9). A study conducted by Williams and Clark (2004) evaluated factors that affected the performance of 306 college students in human development multiple-choice exams where the sample consisted of 79% female and 21% males (Williams and Clark 2004, p.232). The findings showed that while students perceived effort more important than ability and teacher input, the latter causal attributions were better predictors of exam performance (Williams and Clark 2004, p.237). Genuine or false, perceived causes have psychological consequences that affect motivation and intervention is needed to remedy difficulty cases (Williams et al. 2004, p.20).

The original attribution model (Weiner et al. 1971, p.96) presented four causes as most responsible for success and failure in achievement contexts: ability, effort, task difficulty, and luck (Williams et al. 2004, p.19). Ability refers to whether achievement outcome is perceived to be influenced by ease in learning, skill or knowledge of the perceiver (Alderman 2008, p.29). Effort refers to whether an achievement outcome is perceived to be influenced by how hard the perceiver tried to accomplish a task (Alderman 2008, p.29). Task difficulty refers to whether an achievement outcome is perceived under the influence of the degree of difficulty of a certain task. Luck refers to whether an achievement outcome is

perceived to happen by chance. While ability and effort tend to be dispositional, task difficulty and luck tend to be situational (Petri and Govern 2004, p.324).

Ability, task difficulty, and luck were common to Heider's naïve psychology along with fatigue and mood. Weiner revealed that the selection of the causes in the original model was based on Heider's work, but he added that intuition played a role too (Weiner 1979, p.4). Yet, Heider established an additive relation between personal and environmental causes and multiplicative relation between motivation and personal causes, whereas Weiner and others claimed no specific relationship amongst the four causes: ability, effort, task difficulty, and luck (Weiner et al. 1971, p.96).

In addition to the four typical attributions ability, effort, task difficulty, and luck (Schunk 2001, p.179; Seifert 2004, p.138), authors reported additional perceived causes such as mood, family background, and help or hindrance from other people (Dörnyei 2001, p.22; Santrock 2001, p.401). Furthermore, other research reported additional causes such as learning strategies (Alderman 2008, p.29), teacher being clever, liking the content (Bornholt and Möller 2003, p.222), fatigue, health, and teaching methods (Child 1997, p.69). Hence, research confirmed that the four causes that were foreseen as the most responsible causes by theorists were the most frequently attributed causes to success and failure by people. However, they are not the only causes adopted by attribution theory as some authors convey (Arnone 2005, p.77). It is evident that there are many more causes to success and failure (Weiner 2006, p.9). Therefore, researchers ought to use open-answer format questions in their attempts to find people's attributions to success and failure. Otherwise, restricting research to predetermined causes might yield wrong findings (Weiner 1982, p.165) because it is enslaving to people's perceptions (Vispoel and Austin 1995, p.381).

Causal ascriptions for an event may vary from one individual to another (Dörnyei 2001, p.22; Elliott et al. 2005, p.17). However, research showed the dominance of

ability and effort as causal ascriptions to success and failure (Legette 1998, p.102; Dörnyei 2001, p.22; Alderman 2008, p.30). That is, people tend to attribute their own success to high ability or hard work, whereas they tend to attribute their own failure to low ability or little effort (Weiner 1972, p.204). As yet, there are no studies in Lebanon that support or deny this finding. The lack of such studies is a serious issue, especially because there is evidence that attributions differ from one culture to another. Biggs (2003, p.59) reported that westerners tend to attribute success more to ability, whereas Chinese tend to attribute it more to effort. A study by Bempechat et al. (1996, p.55) included 385 Caucasian, African-American, Hispanic, and Indochinese children in the 5th and 6th grades from in and around the Boston area. It investigated the relationship between attributions for success and failure and mathematics achievement. Students were asked to respond to the mathematics portion of the Sydney Attribution Scale and the Wide Range Achievement Test for mathematics. Across ethnic groups, respondents tended to attribute high achievement to ability, but not to effort. Also, they did not attribute failure to lack of ability (Bempechat et al. 1996, p.57). These results show that the studied minority children from various ethnic groups living in the Boston area share the same pattern of attributions of westerners as reported by Biggs (2003) above. Other authors reported that effort is emphasised by East Asians in achievement contexts (Elliot and Dweck 2005, p.497).

However, the findings of a comparative research into academic motivation in Kentucky in the United States of America, Sunderland in the United Kingdom, and St. Petersburg in Russia, showed that American and English adolescents were more likely to attribute high achievement to effort than to ability, while Russian adolescents were just the opposite (Hufton et al. 2002, p.65). Bornholt and Möller (2003, p.217) examined sources and consequences of attributions for achievement for adolescent boys and girls, aged 11 to 16 years, at co-ed (N = 663) and single-sex schools (N = 697) in Australia. Attributions included clever, effort, liking of content, task difficulty, help from teachers, help from parents,

and feeling on the day. Adolescents rated effort as the most important cause for success and failure in Mathematics and English (Bornholt and Möller 2003, p.224). Lack of effort and task difficulty were the perceived as the main causes for low achievement in the same subject areas (Bornholt and Möller 2003, p.225). Other researchers assert that English and American children place stronger emphases upon effort than ability and suggest that the other way around belief is just a myth (Elliott et al. 2005, p.99).

Some research provided evidence that causal attributions tend to be subject specific. The study by Williams and Clark (2004) (mentioned in the first paragraph of this section) represented effort by four items on a 12-item rating scale. Furthermore, two and six items reflected ability and teacher input respectively. The researchers reported that three effort practices received the highest ratings reading, note-taking, and attendance. The fourth effort practice, amount of time spent studying for the exam, was ranked 11th (Williams and Clark 2004, p.237). The finding about the differences within the effort area added to the students' perceptions that some effort practices are more important than ability and teacher input indicate that attributions are specific to subject-matter.

Attributional response may vary according to outcome, subject area, and activity (Vispoel and Austin 1995, p.399). Vispoel and Austin (1995, p.384) investigated 211 Caucasian junior high school students living in a small town in eastern Iowa. Participants filled a questionnaire of 105 items that assessed either success or failure attributions in four subject areas: math, English, general music, and physical education. Except for items related to demographic information and course grades, the questionnaire included 6-point Likert-scale items. Data was analysed using a 2 x 8 x 4 ANOVA design. The numbers 2, 8, and 4 represent outcome, attributions, and subject area respectively. The researchers conducted one-way MANOVA for combinations of outcome and subject area followed by univariate ANOVAs and Scheffé tests.

The previous research raises a major concern about attributional responses specific to computer programming. Advanced electronic searches were performed on the following three databases British Education Index (1979 to March 2007), Australian Education Index (1975 to March 2007), and ERIC (1966 to March 2007) using the search terms 'attribution theory', and 'programming'. The search returned 0 results. The researchers Phelps and Ellis (2002) affirmed that 'very little research has been conducted on the potential role of attribution in computer learning and/or training contexts' and added 'very little research seemed to derive from a contemporary adult education perspective' (Phelps and Ellis 2002, p.517). The lack of research shows the importance of the current study to the computer education field in particular and to the body of attribution research in general. Still, the small number of documented causes within the achievement domain by theorists and researchers serve as the building blocks for the likelihood of understanding motivation in achievement contexts related to computer programming.

Causal dimensions

The identification of a causal attribution marks the beginning of another important phase in the attribution theory of motivation. It is the process of attaching a meaning and significance to every identifiable cause. To give an attributional cause a meaning, its underlying properties should be identified (Williams et al. 2004, p.20). Central to this phase is the classification of causes based on their underlying properties (Graham and Latham 1994, p.32; Weiner 2006, p.9). Consequently, despite the apparent difference, causes that belong to one class are similar in their same underlying properties (Weiner 1995, p.251). In other words, causes are classified based on their genotype, rather than phenotype (Dresel et al. 2005, p.2).

Weiner and others followed Heider's (1958) model in differentiating the four causal attributions as personal or environmental factors (Dresel et al. 2005, p.2). That is, causes of events are ascribed to either internal or dispositional factors

within a person, or to external or situational factors outside a person (Schultz and Oskamp 2000, pp.42-3). Yet, Weiner et al. (1971, p.96) proposed stability as a second dimension of causality. Heider's (1958) analysis of dispositions as either unchanging structures or processes had its influence on incorporating the stability dimension into achievement settings (Heider 1958, p.81; Weiner 1979, p.6; Försterling 2001, p.112). On one hand, Weiner et al. (1971, p.96) noticed that a personal factor such as ability remains consistent over time, whereas a personal factor such as effort may change over time. On the other hand, they noticed that an environmental factor such as task difficulty remains the same over time, whereas an environmental factor such as luck may change over time. This analysis explained some of the confusion that faced research that focused on just the first found dimension (Anderson and Arnoult 1985, p.247). The stability dimension complemented the personal-environmental dimension (Malle 2002, p.20). Weiner et al. (1971, p.96) called the personal-environmental dimension locus of control, and referred to it as internal-external dimension too. The two dimensions produced four possible combinations of attributions as follows:

Table 2.1 Possible Causal Attributions of Success and Failure
Classified Based on Locus of Causality and Stability

Property	**Internal**	**External**
Stable	Ability[1]	Task difficulty[1]
Unstable	Effort[1]	Luck[1]

1. Weiner et al. (1971, p.96)

The introduction of the second dimension gave an additional meaning to internal and external factors. This additional meaning helped in solving the difficulty encountered in studies where all internal or all external factors were believed to be the same (Anderson and Arnoult 1985, p.247). For example, as the table above illustrates, people started to perceive ability as having two underlying properties

internal and stable. Some literature embraced the 2 x 2 causal attributions categorization scheme based on just two dimensions, locus of control and stability (Child 1997, pp.69-70; Legette 1998, pp.102-3).

In 1979, Weiner brought to light a third dimension of causality called controllability (Weiner 1979, p.6). He rightfully changed the name of the 'locus of control' dimension to 'locus of causality' (Weiner 1979, p.6; Elliot and Dweck 2005, p.76) in accordance with his identification of a third dimension (Phelps and Ellis 2002, p.516). Some authors continue to use the term locus of control. For instance, author Arnone (2005) wrote 'a child who feels she has little control over a situation, including her learning, has a perceived external locus of control and will likely attribute either positive or negative outcomes to external conditions' (Arnone 2005, p.78). Also, Weiner (2006, p.10) finds the phrase 'internal locus of control' confusing. Had Arnone used locus of causality instead of locus of control, her argument should have been clearer. In addition, Arnone argues that when a situation is out of control people perceive the cause outside them (Arnone 2005, p.26; Arnone 2005, p.78). She confused controllability with locus of control. A person can feel little or no control over learning due to internal causes too such as lack of ability (Hall et al. 2004, p.592; Weiner 2006, p.10). An uncontrollable cause can be perceived as either internal or external.

Introducing controllability as a third dimension was an important contribution from Weiner to attribution theory of motivation (Elliott et al. 2005, p.17). In fact, one more time Weiner was enlightened by an unpublished doctoral dissertation of Rosenbaum (1972) (Weiner 1979, p.6). According to Weiner, Rosenbaum found out that not all internal and unstable causes are the same. Weiner (1979, p.6) reported that Rosenbaum's argument was that internal and unstable causes can be distinguished based on 'intentionality'. Fatigue and effort are both internal and unstable causes, but they are distinguishable. Fatigue is unintentional, whereas effort is intentional. Weiner criticises the use of the term intentional on the basis that one does not fail because of effort intentionally (Weiner 1979, p.6). Instead,

he suggests using controllability. According to Weiner, fatigue is labelled uncontrollable, whereas effort is labelled controllable. The same reasoning applies on internal and stable causes such as learning strategy and ability. Learning strategy is controllable, whereas ability is uncontrollable. Nevertheless, controllability accounted for differences in people's emotions. In a paper that introduces the concept of academic resilience, Martin (2002, p.37) chose the control dimension from the attribution theory to build his own model of motivation and academic resilience. He believes that control 'primarily determines students' response to setback, pressure, or fear of failure' (Martin 2002, p.37). Controllability has an important role to play as it will be linked to the expectancy-value approach, a concept that will be handled later.

The search for more causal dimensions continued. Weiner (1979, p.7) proposed two additional causes, globality and intentionality. The proposed globality dimension refers to whether the perceived cause is influencing all similar tasks or it is specific to the task under focus (Phelps and Ellis 2002, p.516). An example of a global attribution is 'All teachers are either unfair or very demanding. That is why I am failing my courses.' Here, failure is attributed to a global cause that will determine the outcomes of all future courses (Petri and Govern 2004, p.325). An example of a specific attribution is such as 'I failed the math course because the teacher was unfair.' Here, failure is attributed to specific cause related only to one course. The global cause above can be perceived as external, stable, and uncontrollable. Also, the specific cause above can be perceived as external, unstable, and uncontrollable. Thus, it was possible to locate the global and specific causes in the causal space using locus of causality, stability, and controllability. Consequently, it will be possible to explain the resulting psychological consequences without using a fourth dimension. Intentionality refers to whether the perceived cause was done on purpose or not. This construct overlaps with controllability and did not gain any support (Phelps and Ellis 2002, p.516).

Theorists and researchers assert that there are only three causal dimensions (Beck 2004, p.333; Elliot and Dweck 2005, p.76). Weiner (2006, p.11) stated that it is unknown why the number of causal dimensions is limited. Consequently, attribution theory of motivation in its present state calls for analysing a cause based on just three dimensions (Weiner 2000, p.4; Griffin 2006, p.3). The three dimensions of causality are defined as follows (Griffin 2006, p.3; Alderman 2008, p.30):

1) Locus of causality: refers to whether the perceived cause is an internal or external factor to the person. The causal properties associated with the locus of causality dimension are internal and external. Examples of internal factors are ability or aptitude, effort, and mood. Examples of external factor are luck, task difficulty.

2) Stability: refers to whether the perceived cause remains the same or changes over time. The causal properties associated with stability are stable and unstable. Examples of stable factors are ability and task difficulty. Examples of unstable factors are effort and luck.

3) Controllability: refers to whether the perceived cause is subject to volitional alteration. The causal properties associated with the controllability dimension are controllable and uncontrollable. Luck is uncontrollable, whereas effort is controllable.

Once a cause is attributed to success or failure, people subjectively determine its location on each causal dimension. Table 2.2, p.39, depicts some examples. It is the individual subjectivity that anchors causes on and between the ends of a dimension such as illness and mood. For example, illness may possibly be perceived as either an internal or an external cause. If a person is permanently sick, the person may perceive illness as having an internal cause. If a person is temporarily sick due to flu, the person may perceive the present illness as having an external cause. People can come to an agreement on the location of some

causes on a dimension (Weiner 1979, p.6; Elliot and Dweck 2005, p.76). For instance, many people conceive ability as an internal, stable, and uncontrollable cause, and luck as an external, unstable, and uncontrollable cause (Weiner 2000, p.5; Santrock 2001, p.401). Still, it happens that a person diverges from such general agreement (Seifert 2004, p.138) and perceives ability as internal, unstable, and controllable and luck as an internal and stable cause. Weiner (1985, p.518) contends that the location of a cause on a dimension might vary not only from one individual to another, but also with time, and in different contexts.

Research on how people perceive causal attributions in the causal space generated a great deal of controversy. A study was conducted on 87 sixth grade students with an average age of 12.2 years in Germany, using a mathematics questionnaire. The study findings showed that students perceived each of the causal attribution they made differently with respect to every causal dimension (Dresel et al. 2005, p.10). Another study was conducted by Latu (2004, p.345) on 24 students who were the most successful Pacific Island students in mathematics and were from low socio–economic schools in the Manuku region, New Zealand, using a survey questionnaire. The findings showed that almost all of those students attributed their achievement to external factors (Latu 2004, p.348). The 2 studies above yielded contradicting results, most probably because they were conducted in two different cultures.

The underlying properties of causal attributions have psychological consequences on students (Elliott et al. 2005, p.18). Many researchers have supported this link (Dresel et al. 2005, p.2). In turn, the psychological consequences, whose major constituents are expectancy and affect, energize or inhibit motivation (Graham and Weiner 1996, p.71; Dörnyei 2001, p.22). Thus, expectancy and affect determine subsequent action (Weiner 1986, p.164). While certainly complex, this section showed that many researchers believe that the usefulness of causal attributions is located in their properties (Phelps and Ellis 2002, p.516; Elliott et al. 2005, p.17).

Table 2.2 Possible Causal Attributions of Success and Failure in a Course Classified Based on the Three Causal Properties

Combination of Causal Properties			Possible Causal Attributions for Course		
Locus of Causality	**Stability**	**Controllability**	**Cause**	**Success**	**Failure**
Internal	Stable	Uncontrollable	Ability	High ability	Low ability
		Controllable	Study Habit	I study regularly	I never study
	Unstable	Uncontrollable	Illness	I overcome the flu	I am sick all the time
		Controllable	Effort	I tried hard	I didn't prepare
External	Stable	Uncontrollable	Task Difficulty	The exams were easy	It was a very hard course
		Controllable	Others' Mood	I had a sympathetic instructor	I had an unfair instructor
	Unstable	Uncontrollable	Luck	I passed by chance	I studied the wrong things
		Controllable	Others' Effort	My friends helped me	My friends failed to help

Causal antecedents

Causal antecedents are sources of information that serve as spurs to causal attributions (Seifert 2004, p.138). Causal antecedents are influenced by emotional reactions that follow the receipt of a grade, happiness after success and sadness after failure (Weiner 2000, p.4). Causal antecedents include personal feelings states and affective communications from others (Weiner 2000, p.4). Thus, causal antecedents can be classified as direct causal antecedent cues or indirect causal antecedent cues (Alderman 2008, p.32). It is possible that a student uses both direct and indirect causal antecedent cues to infer causal attributions.

Direct causal antecedent cues. Weiner et al. (1971, pp.98-100) presented some direct causal antecedent cues that contribute to the formation of causal attributions (Frieze and Bar-Tal 1979, p.16). Past history of success and failure at the same task or similar tasks is a source of influence on attributions about ability (Seifert 2004, p.138). For example, one more success following a history of successes is likely to be attributed to internal causes. If an internal cause is perceived as stable, then expectations of future success are instilled (Biggs 2003, p.59). Performance of others or knowledge of social norms are sources of influence on attributions about task difficulty or the self (Weiner 2000, p.4). For example, when most of the students pass a course, the course is perceived as easy. When few students pass a course, the course is perceived as difficult. Should a student pass a course when most of the class passes the course, the achievement outcome is attributed to course easiness. When a student fails a course when most of the class passes it, most likely the achievement outcome is attributed to the student's ability which is a factor internal to the student (Graham and Weiner 1996, p.71; Seifert 2004, p.138). However, if the outcome is at odds with past history of achievement outcomes, most likely the failure is attributed to unstable factor such as lack of effort. Thus, the cause is attributed to self when the achievement outcome is at odds with the social norms of the group and past history. A random pattern of previous achievement outcomes leads to attributing the last outcome to luck. The subject area has an influence on causal attributions

(Vispoel and Austin 1995, p.381). Hedonic biasing is another attributional antecedent where people tend to ascribe success to themselves and failure to factors outside the self (Vispoel and Austin 1995, p.380; Weiner 2000, p.4).

Indirect causal antecedent cues. The source of indirect causal antecedent cues is other people such as peers, parents, and teachers. These cues include praise versus blame, sympathy versus anger, and help versus neglect (Graham and Weiner 1996, p.72; Brophy 1998, pp.66-7; Alderman 2008, pp.33-4):

1) Praise versus blame: praising a student after passing an easy course functions as an antecedent cue to low-ability of the recipient. Absence of blame after failing a course functions as an antecedent cue to low-ability of the failing student.

2) Sympathy versus anger: expressing sympathy to a student after passing an easy course or failing a course functions as an antecedent cue to low- ability. Hence, an emotional reaction of pity following success or failure undermines the recipient's belief about ability. Showing reasonable anger to a failing student is a cue that the recipient is capable of passing a course should the student tried harder.

3) Help versus neglect: unsolicited help to a student throughout a semester functions as an antecedent cue to low-ability cue. Relative neglect functions as an antecedent cue to lack of effort.

Teachers' attributions for their students' performance influence their motivation through comments and remarks (Alderman 2008, p.53). Teachers who communicate their low ability attribution to failure, an uncontrollable cause, to their students lead them to believe that they are incapable of succeeding (Biggs 2003, p.58). Teachers who communicate their lack of effort attribution to failure, a controllable cause, lead their students to believe that they have a chance to succeed (Biggs 2003, p.58).

Causal consequences

Causal attributions to success or failure are the key to both understanding present academic achievement and predicting subsequent achievement outcomes (Santrock 2001, p.402; Alderman 2008, p.28). Weiner (1979) asserted that each causal dimension 'has a primary psychological function or linkage, as well as a number of secondary effects' (Weiner 1979, p.8). In other words, the underlying properties of causal attributions arouse cognitive and affective reactions (Frieze and Bar-Tal 1979, p.17). Thus, causal attributions have an impact on motivation through their underlying properties (Anderson and Arnoult 1985, p.248).

The process starts by mapping causal properties to the two main determinants of motivation, expectancy and value (Weiner 2000, p.5; Elliot and Dweck 2005, p.76). The first determinant is termed expectation or expectancy. It refers to 'the individual's expectancy of success in a given task' (Dörnyei 2001, p.20). The second determinant is termed valence or value. It refers to 'the value the individual attaches to the success on that task' (Dörnyei 2001, p.20). The higher the expectancy of success or the incentive value are, the stronger the likelihood of taking action to accomplish the target task (Child 1997, p.65). Decades later, the expectancy-value theory was still used as a framework by the many influential works done in motivation (Dörnyei 2001, p.20; Arnone 2005, p.25).

Advocates of the expectancy-value theory of motivation posit that students do not willingly engage in tasks they perceive as insignificant or as very difficult and complicated to succeed (Brophy 1998, p.15; Biggs 2003, p.58). For example, a business computing student who undervalues computer programming courses does not study for the course even if the student has the required knowledge and skills. In addition, a student who believes that there is no chance to pass a computer programming course does not get motivated to study, even if the course is highly valued. The two examples use extreme cases to illustrate that both expectancy of success and value for the task must be present to arouse motivation. Motivation is not evoked when one of the determinants is absent

(Biggs 2003, p.58; Arnone 2005, p.26). Computer students who take the course unwillingly in partial fulfillment of their business computing degree are expected to 'experience negative affective and cognitive reactions' (Brophy 1998, p.15).

Attribution theory integrated the expectancy-value approach without preserving the multiplicative formula between its determinants (Graham and Weiner 1996, p.71). The underlying properties of causal attributions are thought to serve as cognitive mediators of expectancy and value (Latu 2004, p.344). The integration gave insight to authors to call for mergers between different theories of motivation (Ford 1992, p.11). The stability dimension of a causal attribution alone generates a perception related to the expectancy determinant of motivation (Weiner 2000, p.3; Elliott et al. 2005 p.18). The stability-expectancy linkage was postulated by Weiner (1986, p.114) as 'changes in expectancy of success following an outcome are influenced by the perceived stability of the cause of the event.' He considered it a general law and called it the 'Expectancy Principle'. When a cause is perceived as stable, the perceiver expects the same outcome again with increased certainty (Weiner 1986, p.115). A student who attributes failure to low-ability, a stable factor, will most likely expect to fail again (Middleton and Spanias 1999, p.70; Elliot and Dweck 2005, p.76). A student who attributes success to high-ability will most likely expect to succeed again (Legette 1998, p.109; Middleton and Spanias 1999, p.70). When a student attributes failure to lack of effort, an unstable factor, most likely the student will not expect to fail again (Legette 1998, pp.109-110; Elliot and Dweck 2005, p.76). The three examples illustrate two corollaries of the Expectancy Principle (Weiner 1986, p.115).

Causal attributions influence emotions as well as expectancies (Weiner 2000, p.3). Locus of causality and controllability, the other two dimensions of causal attribution, generate affective reactions (Weiner 1986, p.129) that accompany expectancies. Those emotions are linked with the value determinant of motivation (Elliot and Dweck 2005, p.76). The emotions activated by ascriptions include

pride, self-esteem, hopelessness, hopefulness, shame, guilt, anger, pity, and sympathy (Weiner 2000, p.3; Bornholt and Möller 2003, p.219). The particular combination of expectations and emotions generates motivation that guides future behaviour (Schultz and Oskamp 2000, p.45). Consequently, different attributions to achievement outcome produce different behavioural reactions (Molden and Dweck 2000, p.132).

Weiner et al. (1971, pp.113-4) contended that: attribution of success to high ability and effort guides high achievers to undertake achievement-related activities; attribution of failure to lack of effort guides high achievers to persist in undertaking achievement-related activities; attribution of success to external factors guides low achievers to avoid undertaking achievement-related activities; attribution of failure to lack of ability guides low achievers to quit engaging in achievement-related activities (Hall et al. 2004, p.592). Thus, Weiner et al. (1971, pp.113-4) showed that expectancy of success is influenced by attributions of success to stable factors, ability or task difficulty (Child 1997, p.70; Petri and Govern 2004, p.326). For example, when failure is attributed to ability, low expectancies are construed (Weiner et al. 1971, pp.113-4) which has a debilitating effect (Child 1997, p.70). Consequently, the expectancy determinant of motivation plays a major role in forming an individual's expectancies for future outcomes.

The underlying properties of causal attributions as perceived by the students themselves predict their motivation on similar subsequent tasks because they have psychological consequences (Seifert 2004, p.138). To start with, the locus of causality dimension of a causal attribution to success or failure influences the student's pride and self-esteem (Graham and Weiner, 1996, p.71; Weiner 2000, p.3; Santrock 2001, p.401). For example, attribution of success to internal factors such as high ability enhances self-esteem, whereas its attribution to external factors such as help from teacher decreases self-esteem (Schunk 2001, p.133). While Schultz and Oskamp (2000, p.45) agree that attributions to internal factors

affect self-esteem, they believe that attributions to external factors do not affect it. Weiner (2006, p.9) posits that 'for self-esteem to rise or fall, attributions must be made to the self by the actor.' Following success, attribution to internal causes become positive motivators. Attribution of failure to internal factors decreases self-esteem. Any decrease in self-esteem does not help achievement striving in future endeavours (Weiner 2000, p.3). The locus of causality dimension of causal attributions to success or failure has an effect on motivation through its value determinant (Anderson and Arnoult 1985, p.248).

The stability dimension of a causal attribution to success or failure influences the student's expectation of future success (Schultz and Oskamp 2000, p.45; Santrock 2001, p.401). The term expectancy refers to anticipation of future success (Weiner 2000, p.5; Arnone 2005, p.26). Attribution of success to stable factors such as high ability increases the expectancy of future success at similar tasks (Graham and Weiner, 1996, p.71). Expectancy of success generates a feeling of hopefulness (Weiner 2000, p.3). Together, cognitive and affective processes, the psychological consequences particular to this case, help achievement striving in future endeavours (Weiner 2000, p.3). Yet, attribution of failure to stable factors such as low ability decreases the expectancy of future success at similar tasks (Seifert 2004, p.140). Expectancy of failure generates a feeling of hopelessness (Weiner 2000, p.3). Together, cognitive and affective processes, the psychological consequences particular to this case, hinder achievement striving in future endeavours (Weiner 2000, p.3). Attribution of failure to unstable factors such as lack of effort promotes expectation of future success at similar tasks (Weiner 1995, p.262). In this case, Weiner believes that expectancy of future success is higher when compared to a case where failure is ascribed to a stable factor (Weiner 1995, p.262). Expectancy of success generates a feeling of hopefulness. Together, cognitive and affective processes, the psychological consequences particular to this case, in this case help achievement striving in future endeavours. Attribution of success to unstable factors such as good luck or good mood of teacher weakens expectancy of future success at similar tasks

(Biggs 2003, p.59). In this case, Weiner believes that expectancy of future success increases with lesser degree compared to a case where success is ascribed to a stable factor (Weiner 1979, p.9). Motivational processes in this discussion were future-oriented in accordance with the psychological literature on motivation (Ford 1992, p.72). Overall, the stability dimension of causal attributions to success or failure has an effect on motivation through its expectancy determinant (Anderson and Arnoult 1985, p.248).

The controllability dimension of a causal attribution to success or failure influences the student's feelings of shame, guilt, anger, gratitude, and pity (Graham and Weiner 1996, p.72; Schultz and Oskamp 2000, p.45; Weiner 2000, p.3). For instance, attribution of failure to: 1) external-controllable factors such as too much noise inside the exam hall generates anger; 2) internal-controllable factors such as lack of effort generates a feeling of guilt; and 3) internal-uncontrollable factors such as low ability generates a feeling of shame and humiliation (Schultz and Oskamp 2000, p.45; Santrock 2001, p.402). A feeling of moderate guilt is a positive motivator, whereas a feeling of shame is a motivational inhibitor (Weiner 1995, p.263). The controllability dimension of causal attributions to success or failure has an effect on motivation through its value determinant.

Tables 2.3-2.5 below illustrate perceived causes, their properties, their psychological consequences, and behavioural consequences. In these tables, different rows illustrate different examples. Data with the same superscript and appearing in cells pertaining to the same row are cited by one author or researcher. Cells without references reflect the researcher’s personal view, and no evidence was found in the literature to support the data in them.

Table 2.3 Possible Perceived Causes of Success and Failure Based on the Locus of Causality Dimension and Their Emotional and Motivational Consequences

Property	**Example**	**Event**	**Emotion**	**Motivation**
Internal[1,3,5]	Effort[3,5]	Success[1,3,5]	Enhanced self-esteem[1,3]	Positive motivator[1,5]
Internal[1,3]	Low ability[3]	Failure[1,3]	Decreased self-esteem[1,3]	Motivational Inhibitor[1]
External[4,6]	Good luck[4,6]	Success[4,6]	Decreased pride[4,6]	Motivational Inhibitor
External[2]	Discrimination[2]	Failure[2]	Maintained self-esteem[2]	Motivational Inhibitor[2]

1. Graham and Weiner 1996, p.71
2. Weiner 2000, p.6
3. Santrock 2001, p.401
4. Seifert 2004, p.140
5. Elliott et al. 2005, p.18
6. Alderman 2008, p.36

Table 2.4 Possible Perceived Causes of Success and Failure Based on the Stability Dimension and Their Emotional and Behavioural Consequences

Property	**Example**	**Event**	**Expectancy**	**Emotion**	**Behavioural Consequence**
Stable[2,4]	Aptitude[2,4]	Success[2,4]	Success[2,4]	Optimism	Helps achievement striving
Stable[2,3,4]	Low ability[2,3,4]	Failure[2,3,4]	Failure[2,3,4]	Despair[3,4]	Afflicts achievement striving[4]
Unstable[4]	Effort[4]	Success[4]	Success[4]	Hope[4]	Helps achievement striving
Unstable[1,2,3]	Bad luck[1,2,3]	Failure[1,2,3]	Success[2]	Hope[3]	Persistence augmented[1]

1. Graham and Weiner 1996, p.71
2. Santrock 2001, pp.401-2
3. Seifert 2004, p.140
4. Alderman 2008, pp.37-8

Table 2.5 Possible Perceived Causes of Success and Failure Based on the Controllability Dimension and Their Emotional and Motivational Consequences

Property 1	**Property 2**	**Example**	**Event**	**Emotion**	**Motivation**
Controllable[2,4,5]	Internal[2,4,5]	Lack of effort[2,4,5]	Failure[2,5]	Guilt[2]/ Hopeful[4,5]	Positive motivator[4,5]
Controllable[3]	Internal[3]	Effort[3]	Success[3]	Pride[3]	Positive motivator[3]
Controllable[1]	External[1]	Noise[1]	Failure[1]	Angry[1]	Persistence
Uncontrollable	Internal[5]	High ability[5]	Success[5]	Pride[5]	Positive motivator
Uncontrollable[2,4]	Internal[2,4,5]	Low ability[2,4,5]	Failure[2,4,5]	Shame[2]/ Helpless[4,5]	Motivational Inhibitor[4,5]

1. Graham and Weiner 1996, p.72
2. Santrock 2001, p.402
3. Seifert 2004, p.140
4. Elliott et al. 2005, p.18
5. Alderman 2008, pp.36-7

Suppose a student attributes failure in a course to lack of effort. The underlying properties of lack of effort as a cause are internal, unstable, and controllable. The internal and controllable properties will generate a reduction in self-esteem and a feeling of guilt respectively (Linnenbrink and Pintrich 2000, p.211; Santrock 2001, p.402). The unstable property promotes expectancy of success in future tasks. In turn, expectancy of success generates a feeling of hopefulness. The psychological consequences of attributing failure to lack of effort encompass a number of emotional outcomes such as a reduction in self-esteem, guilt, and hope, in addition to a single cognition of high expectancy of success. These psychological consequences conjure a positive motivator which promotes the kind of behaviour that persists with future achievement-related activities (Schultz and Oskamp 2000, p.45). It is important here not to neglect the influence of sadness that is felt immediately after failure on subsequent behaviour.

Suppose a student attributes failure in a course to low ability. The underlying properties of low ability as a cause are internal, stable, and uncontrollable. The internal and uncontrollable properties will generate a reduction in self-esteem and a feeling of shame respectively (Santrock 2001, p.403). The stable property promotes a low expectancy of success in future tasks (Weiner 1995, p.263). In turn, a low expectancy of success generates a feeling of helplessness or despair (Linnenbrink and Pintrich 2000, p.211). The psychological consequences of attributing failure to low ability encompass a number of emotional outcomes a reduction in self-esteem, shame, and helplessness, and a single cognition of low expectancy of success. These psychological consequences conjure a motivation inhibitor which promotes the kind of action that hinder achievement striving such as avoiding future achievement-related activities, changing major, or even dropping out of university (Schultz and Oskamp 2000, p.45; Weiner 2000, p.6). Again, it is important here not to neglect the influence of sadness that is felt immediately after failure on subsequent behaviour. Parents of such student should offer help. The teacher can play a role by suggesting different learning strategies. The absence of tangible help have a debilitating effect on the student.

With the help of nine Black high-achievers enrolled in the Honors Programme at a large public University, Griffin (2006, p.1) examined motivation from a multi-dimensional framework using semi-structured interviews. Griffin (2006, p.10) stated that 'congruent with attribution theory … [participants] were able to translate academic difficulty into motivation rather than hopelessness as a result of their perceived agency over their educational outcomes and attribution of their academic difficulties to controllable and transient factors.' The researcher does not think it was a matter of translating academic difficulty into motivation. I believe that the past history of high-achievers that was rich with successes increased the magnitude of their motivation to the extent of overcoming academic difficulties that Griffin (2006, p.10) mentioned such as poor teaching and lack of familiarity with the subject. The evidence was given by Griffin (2006, p.10) who wrote 'all participants exhibited a perception of agency and controllability, resolving to just work harder and put forth a better effort.' The problem with Griffin's study is that it did not start by obtaining the causal attributions of participants' successes and failures. Instead, Griffin analyzed academic difficulties of high-achievers from an attributional perspective (Griffin 2006, p.8). This is the reason why Griffin concluded that it was difficult to distinguish 'between and implications of students making internal versus external attributions for their academic challenge' (Griffin 2006, p.8). Another source for the difficulty is the small sample.

By establishing links between the causal attribution properties and the two determinants of motivation, Weiner (2000) completed the attribution process and brought an end to the critique that described attribution theory as a theory that 'marks a transition point' (Harvey and Weary 1985, p.281).

Attributional consequence

Attribution theory of motivation had an impact on other frameworks such as self-efficacy (Child 1997, p.69; Horner and Gaither 2004, p.165) and learned-helplessness (Arnone 2005, p.79).

Self-efficacy. Self-efficacy refers to 'judgement students make about their capability to accomplish a specific future task' (Alderman 2008, p.69). After success, causal attributions to internal factors such as intense effort or high ability lead to increased confidence in that internal factor and consequently promote self-efficacy (Brophy 1998, p.57; Biggs 2003, p.59). A strong sense of self-efficacy emancipates motivation in face of difficulties encountered while achieving a desired task (Dörnyei 2001, p.23; Martin 2002, p.38). Students with increased self-efficacy are stimulated to work harder on future tasks (Myers 2000, p.78). A low sense of self-efficacy is a motivational inhibitor. People with low sense of self-efficacy feel incapable in face of difficulties (Dörnyei 2001, p.23). Those people 'view situations as more difficult than they are' (Martin 2002, p.38). Self-efficacy is associated with achievement (Seifert 2004, p.137).

Learned Helplessness. Learned helplessness refers to the state where a person learned not to try because trying has no successful consequences (Schunk 2001, p.266; Bentham 2002, p.129). The learned helplessness concept has been related to motivation from an attributional perspective (Middleton and Spanias 1999, p.71; Arnone 2005, p.79). After failure, causal attributions to ability which is an internal, stable, and uncontrollable factor lead to motivation deficit and depression (Maag 2004, p.365). Myers (2000, p.300) reports that depressed people attribute failure to internal, stable, and global causes. People who use the latter attributional style to explain negative events are thought to be pessimistic (Mitchell and Hirom 2002, p.2). People who attribute their failures to external, unstable, and specific factors such as teacher's mood do not become depressed (Klein 1996, p.337). The reason is that those people tend to have optimistic attributional style (Mitchell and Hirom 2002, p.2). Additional failures followed by ascribing the causes to ability, an uncontrollable cause, lead to learned helplessness (Klein 1996, p.339; Arnone 2005, p.79). Since ability is perceived as internal and stable, learned helplessness becomes a trait (Middleton and Spanias 1999, p.71). Learned helplessness causes more depression (Maag 2004, p.365).

Such students anticipate failure in future endeavours and drop out (Maag 2004, p.365; Alderman 2008, p.45). However, a student who feels helpless in learning computer programming may not hold the same feeling for other subjects (Child 1997, pp.68-9; Alderman 2008, p.45). Computer programming is characterised by constant new learning. This makes the topic, at least initially, confusing to students. Students may develop a state of uncertainty about their success in such courses (Licht et al. 1989, p.254). In particular, students suffering from learned helplessness may immediately decide not to engage in learning computer programming (Alderman 2008, p.47). Learned helplessness can be treated using attribution retraining (Middleton and Spanias 1999, p.71; Maag 2004, p.365) which will be discussed later in this chapter. Learned helplessness is believed to be a contemporary theory that continues to guide motivational research.

Attributional bias

Causal attributions are depicted by the students' subjective perceptions (Elliott et al. 2005, p.17). Although attribution theory suggests that students arrive at causes in a scientific manner, attributional processes are influenced by their biases (Beck 2004, p.334). In his seminal work, Heider mentions clearly that sometimes people's attributions are subject to their personal biases (Heider 1958, pp.115-6). Attributional bias is the tendency to infer mistakenly causal attributions based on antecedent cues (Alderman 2008, pp.34-5). Bias in attributions may have serious consequences on the perceiver and his environment (Myers 2000, p.75). Research into attribution uncovered these potent biases: the fundamental attribution error, the self-serving bias, the group stereotypes bias and the actor-observer bias.

The fundamental attribution error refers to the tendency of ignoring external factors and overemphasising internal factors when explaining others' behaviour (Schultz and Oskamp 2000, p.43; Petri and Govern 2004, p.319; Kassin 2006). The fundamental attribution error occurs even when the perceiver is aware of the influence of situational forces on the actor (Myers 2000, p.60; Trope & Gaunt 2003, p.190). Lee Ross (1977, p.183) gave this tendency its name (Myers 2000,

p.52; Schultz and Oskamp 2000, p.43). This tendency was first identified by Heider (Ross 1977, p.183; Trope & Gaunt 2003, p.190). Some authors believe that the fundamental attribution error is present everywhere (Jones 2001, p.43). Other authors doubt this assumption (Myers 2000, p.59). It is common to hear a statement such as Dana failed because of her low ability. In that example, the perceiver-observer blames Dana for her failure by attributing it to a personal trait. The perceiver's explanation fails to mention any possible influence of situational determinants. If that person is her teacher and treats her accordingly, Dana will be demotivated and will be eventually led to fail in that particular subject area (Myers 2000, p.40; Dörnyei 2001, p.175). Misreading Dana's failure burdened her with additional problems (Jones 2001, p.44). This example also shows that the fundamental attribution error can serve as a self-fulfilling prophecy (Elliot and Dweck 2005, pp.305-6). Following nine separate experiments conducted with undergraduates from different universities, Jones (2001, p.36) states that 'persons as observers are all too ready to infer underlying dispositions, like attitudes, from behaviours, like opinion statements, even when it is obvious that the statements are produced under constraint.' In a study on young boys, Johnston and Lee (2005, p.323) showed that biases in attributional process appear early in life. The study did not include girls.

People commit the fundamental attribution error for several reasons. First, we tend to focus on people rather than the context they are acting in (Myers 2000, p.52; Jones 2001, p.39). Second, it is easier for laypeople to attribute behaviour to inner traits of people we look at (Jones 2001, p.39) compared to studying plausible, seen or unseen, external factors (Beck 2004, p.334). Third, in the Western culture people tend to ascribe bad behaviour to personal dispositions (Myers 2000, p.59).

The fundamental attribution error is also known as correspondence bias (Trope & Gaunt 2003, p.191). Försterling (2001, p.36) contends that 'correspondence refers to the degree of information gained about the dispositions and intentions of the

actor as a consequence of observing an action.' The correspondence bias occurs when we match other people's behaviour with an inner trait of our imagination (Myers 2000, p.53). Still, the bias need not necessarily lead to an error. The error occurs when despite our awareness of the existence of an external factor that has influenced the observed action we ignore it and attribute the outcome to an internal factor.

The self-serving bias refers to the tendency of making attributions to internal factors for our successes and attributions to external factors for our failures (Myers 2000, pp.62-3). Vispoel and Austin (1995, p.389) who conducted a study on the attributions of 211 junior high school students in four subject areas asserted the presence of a self-serving bias. The first class of self-serving bias encompasses all the cases where the credit of success is given to oneself when success is the result of external factors such as good luck, task easiness, or sympathetic instructor (Weiner 2000, p.4). Usually, students credit themselves for receiving good grades in an exam. In such cases, the exam is considered 'a measure of their competence' (Myers 2000, p.63). Such cases aim at enhancing one's ego (Beck 2004, p.334), improving one's image, and amplifying the good news accompanying success (Petri and Govern 2004, p.329). The second class of self-serving bias encompasses all the cases where failure is ascribed to external factors rather than internal factors such as lack of effort or low-aptitude (Weiner 2000, p.4). Myers (2000, p.63) writes that students who 'do poorly are much more likely to criticize the exam.' Such cases aim at protecting one's ego (Beck 2004, p.334), image, and mitigating bad news accompanying failure (Arkin and Baumgardner 1985, p.170). Thus, the intentions behind the self-serving bias are self-enhancement and self-protection (Försterling 2001, p.89). However, disguising the actual causes of action outcome based on self-serving bias leads to self-handicapping (Arkin and Baumgardner 1985, p.170).

The actor-observer bias is identified by Jones and Nisbett in 1972 (Försterling 2001, p.94). Given an event or a behavioural outcome, observers tend to attribute

it to the dispositions of actors, whereas actors tend to attribute it to environmental factors (Goethals 2003, p.14). Actors attribute negative events to external factors to eliminate negative feelings because their presence leads to reducing self-esteem (Försterling 2001, p.101). However, a dispositional attribution for the same event brings about a better emotional return for the observer (Försterling 2001, pp.101-2).

Another source of attributional bias is group stereotypes (Alderman 2008, p.35). For instance, Weiner (2000, p.6) reports that research on African American students show that they attribute failure to external factors. This attributional bias 'stabilizes the positive view of the in group member' (Försterling 2001, p.104). Causal attributions could fall in error due to the complexity of the situation too (Harvey et al. 1985, p.3). The attributional bias discussed in this paragraph and the self-serving bias might appear in the findings of this study because the author is gathering causal attributions that students make about their achievement outcomes. The fundamental attribution error and the actor-observer bias rely on causal attributions made for action outcomes with regard to other people.

Gender and attributions

Attribution theory does not embrace gender differences. While some research showed that causal attributions are the same for females and males students (Birenbaum and Kraemer 1995, p.352; Bornholt and Möller 2003, p.227), other research showed that they are different (Licht et al. 1989, p.253). In a study by Legette (1998, p.109), female participants 'perceived ability and effort as being more important than did males.' Some studies have shown that girls are more likely than boys to attribute their failure to lack of ability (Middleton and Spanias 1999, p.70; Alderman 2008, p.41). Licht et al. (1989, p.253) assert that girls are 'less likely than boys to attribute their successes to high ability', a conviction shared by others too (Middleton and Spanias 1999, p.70). A study was conducted by Mitchell and Hirom (2002, p.1) used questionnaires and semi-structured interviews to investigate gender differences in the explanatory style in years 9 to

12 in several United Kingdom secondary schools. The findings showed that while boys tended to attribute success to dispositional qualities such as intelligence, girls made behavioural attributions such as hard work (Mitchell and Hirom 2002, p.5). Those causal attributions were reversed with failure outcomes (Mitchell and Hirom 2002, p.5). A more recent study that included 161 British Columbian public school students from the fourth and seventh grades showed no significant differences between boys and girls for all 6 success attributions including ability, effort, and strategy, and 5 out of 6 failure attributions (Lloyd et al. 2005, pp.400-2). The sexes differed significantly on the lack of teacher's help attribution which was attributed to failure by girls much more than boys. Furthermore, other studies suggest that differences in causal attributions are domain specific (Vispoel and Austin 1995 p.391; Bornholt and Möller 2003, p.218). That is, previous research findings about differences in causal attributions with gender in Mathematics have to be investigated in the domain of computer programming.

Attribution retraining

For many people finding causal attributions and identifying their respective properties are not used only to predict future behaviour, but to train students to explain failure and success in terms of treatable causes. The idea of attribution retraining stems from the conception that some causal attributions are remediable (Hall et al. 2004, p.606). Obviously, controllable attributions sound easier to change than uncontrollable attributions. It is easier to convince a student to use a different but effective learning strategy (controllable-stable-internal factor) than to change a low ability belief about self (uncontrollable-stable-internal factor) (Arnone 2005, p.78). Still, attribution of failure to stable factors such as low ability can be changed to unstable factors such as lack of prerequisite skills, insufficient knowledge (Arnone 2005, p.87), not making enough effort (Schultz and Oskamp 2000, p.57; Hall et al. 2004, p.591; Alderman 2008, p.55) or reliance on inappropriate learning strategy (Lepper and Henderlong 2000, p.292; Bentham 2002, p.131). This kind of change is recommended by many

educational psychologists (Brophy 1998, p.87; Santrock 2001, p.403). The reason is that once students succeed in shifting their attributions after failure to internal-unstable-controllable causes such as lack of effort, they can be provided with series of steps to remedy the problem and arouse their otherwise dormant motivation (Brophy 1998, p.86). Alderman (2008, p.129) suggests operationalising the cause for the help to be effective. That is, students should be persuaded to follow specific steps such as correcting errors, making extra practice, and completing all assignments. When they make mistakes, the teacher should encourage them to put more effort into it (Vispoel and Austin 1995, p.405). Some researchers provide evidence that such classroom instructions reduce feelings of learned helplessness (Middleton and Spanias 1999, p.71). Teachers' directions and comments are important because they can act as indirect causal antecedent cues. Also, students should comment on their own work in ways that bring about empowerment (Maag 2004, p.365).

Modelling of desirable behaviour is another potent method that can be used to improve students' performance. Nonetheless, exposing students to models who struggle to reach success is preferable over exposing them to models that succeed without any difficulty (Brophy 1998, p.86; Santrock 2001, p.403). In addition to persuasion and modelling of desirable behaviour, Schultz and Oskamp (2000, p.57) report another two methods, provision of relevant information and operant conditioning, as successful in improving performance in achievement contexts. For example, a teacher can show evidence that those students who had made additional efforts such as making extra work and had it corrected passed the course with high grades. Furthermore, a teacher can reinforce statements such as programming requires a lot of practice and can reject statements focusing on intelligence (Vispoel and Austin 1995, p.405).

Graham and Weiner (1996, p.81) contend that change programmes based on unstable attributions for failure are susceptible to failure with the indifferent. Training people to adopt different but treatable attributions that can bring about

success in future tasks is a promising endeavour. Several studies have been conducted to determine how low achievers can be helped to make a shift in their causal attributions. Allen and Dietrich (1991, p.1) conducted an instructional intervention investigation on 72 ninth-graders. An instructional intervention unit was taught for two weeks (Allen and Dietrich 1991, p.8). Out of the 72 students, the researchers interviewed 18 low achievers and noted in 11 of those 'a shift in low-achieving students' attributions and levels of motivation' (Allen and Dietrich 1991, p.12). Hall et al. (2004, pp.592-3) report several successful intervention studies that lead to noticeable increase in college students' grade point averages and other scores following the participation in attribution retraining, including their own study (2004, p.607). Also, some studies have been conducted to evaluate attribution retraining programmes in order to improve attribution retraining methods (Hall et al. 2004, p.593). Hall et al. (2004, p.606) assert that 'the effectiveness of AR [Attribution Retraining] is moderated by both student characteristics and the manner in which the treatment is administered.'

Even though retraining treatments may not work with some individuals, they are worth trying. Wherever change programmes are not available in educational institutions, teachers can compensate by helping students, especially low achievers, change detrimental causal attributions (Mitchell and Hirom 2002, p.12). A study conducted by Horner and Gaither (2004, p.165) aimed at investigating whether attribution retraining embedded in a classroom setting would have an effect on students' attributions and consequently on the mathematics scores. Forty-eight students from two second-grade classes participated while one class received attribution retraining, the other did not. The study showed that on the average students who received attribution retraining decreased their attributions to uncontrollable factors. Still, they reported that the effect of their intervention programme in a real classroom fell short of their expectations (Horner and Gaither 2004, p.169).

Critique of attribution theory

Attribution theory received a blow when Hansen (1985, p.81) declared that it 'reached the end of its useful life as a framework for exploring causal thought.' In the first place, he believed that attribution theorists and researchers were only studying insignificant issues. This was an exaggerated personal view. In fact, it was demeaning to over 900 works published between 1970 and 1980, and 400 to 500 works published between 1978 and 1982 as reported by Harvey and others (Harvey et al. 1985, p.1). However, with reference to the over 900 attributional studies, Reeder (1985, p.87) argues that they did not enhance the theory. Those studies just provided support to the theory (Olson and Ross 1985, p.287). Second, also he saw the attribution methodology as superficial because it begins with a concrete event and then searches for a theoretical causal attribution. Based on previous discussions in this chapter, the least that can be said about this view is that it is over simplistic. Another critique of attribution theory is that the vast amount of research that used the attribution methodology focused only on one dimension, locus of causality (Olson and Ross 1985, p.287). Finally, he anticipated that attribution literature will eventually come to end. Many of the publications used in this study stand out to show the contrary. Years later, Ford (1992, p.164) expressed his view that the use of attribution theory of motivation was on the decline. Almost concurrently, Graham (1991, p.5) reported that attribution theory had continued to have one of the strongest influences on motivational research and her evidence was that 6.6 articles on the average were published per year for the past ten years just in one journal. Vispoel and Austin (1995, p.378) reported finding 2000 published articles and reports with the word attribution appearing in text and title in examining motivation by searching the PsycLIT database, just in the past five years. Few years later, Försterling (2001, p.8) asserts that 'the number of published articles that refer to the keyword "attribution" has hardly decreased within the last few years.' Schultz and Oskamp (2000, p.42) write 'In the last 30 years, the study of attribution processes has been one of the most dominant theoretical and empirical topics in the field of social

psychology.' Furthermore, some writers expressed their conviction that the best work of attribution researchers is yet to come (Berscheid 2001, p.25).

Some of the authors who acknowledged the success of attribution theory in emphasizing cognitive, affective and behavioural consequences of outcomes, believe that it failed to explain what it is that instigates academic achievement behaviour in the first place (Molden and Dweck 2000, p.132). The search for an answer to this critique led to the development of goal theory (Elliott et al. 2005, p.18). According to goal theorists, the identification of student's goal leads to understand the reasons behind being motivated to achieve (Elliott et al. 2005, p.19). The reason is that action springs from and gets directed by goals (Dörnyei 2001, p.25). In turn, the goal theory is criticized for not emphasising the meaning of goals for students (Molden and Dweck 2000, p.137). Instead, the goal theory focused on the goals themselves. Students are not motivated by too easy or too difficult goals, but by attainable goals (Schunk 2001, p.132).

The importance of attributions for success and failure lies in their linkage to motivation that is used to predict future achievement behaviors. Some authors believe that there is lack of empirical evidence that supports this argument (Beck 2004, p.335). Other authors rejected completely the assumption that causal attributions invoke motivational processes (Ford 1992, p.164).

Malle (2004, p.87) claimed that attribution theory did not distinguish between intentional and unintentional behaviour. Consequently, he argued that while attribution theory succeeded in handling cause explanations of unintentional behaviour, it failed to cover reasons, causal histories, and enabling factors (Malle 2004, p.112). Malle stated the following behaviour in the form of a question: How come John aced the exam? The given reason was: He's a stats whiz. Still, from an attributional perspective whiz, which indicates that the student is skilled at stats, is an internal, stable, and controllable behaviour. Thus, an attribution theorist can confidently predict that the student will succeed in similar exams in

the future with high self-esteem and pride. However, for Malle, causal dimensions do not apply to reason explanations (Malle 2004, p.21).

Another critique doubts the ability of laypersons to systematically go through all the cognitive processes hypothesised by the attribution theory and to process the required information at each stage (Ford 1992, p.164). The processes seem to take time, but it is also believed that attributional activities happen subtly (Harvey et al. 1985, p.2). Although people have accurate access to their mental states, sometimes the access is imperfect or perceptions are hidden from others (Wilson 1985, p.9). Furthermore, emotional states that follow success or failure or result from causal attributions do not influence motivation inasmuch as cognitive processes can (Ford 1992, p.170).

Conclusion

The review of literature provided a foundation for this research. From the review of the available research and literature on students' achievement from an attributional perspective, a guiding framework emerged to tackle the problem. The problem that has been facing the researcher is that some business computing students in every semester are failing to learn their introductory computer programming course despite the implementation of major improvements to the teaching and learning environment using the best available technology and the implementation of learner-centred approaches. The researcher decided to learn more about this issue from the students themselves. Meantime, he encountered in the literature researchers examining the relationship between causal attributions and achievement. A search for information on attributions for success and failure in Lebanese students yielded no results. In carrying out this study, the researcher wants to fulfill all the course objectives listed on page 65.

It seems that attribution theory can help in explaining students' motivation to learn. However, the current model should be investigated thoroughly with all its stages. In addition to gaining in-depth knowledge of the attribution model in its current state and of the achievement motivation of computer programming students in the advanced context from an attributional perspective, this study may bring about changes to the attribution model and to the context in which it is carried out. Furthermore, it may contribute to the existing knowledge base about motivation in the computer programming subject area at the undergraduate level that might serve as the building blocks for further investigations and enlightenments.

To start with, it is important to find out whether the traditional causal attributions are relevant to the attributions that students make about their achievement outcomes in computer programming and in the current context. An open-answer format semi-structured interview will be used to obtain the causal attributions and the students' individual perception of their underlying causal properties (Wooffitt and Widdicombe 2006, p.28). Students might make different causal attributions, especially that they will not be presented with a prepared list of causes and that they are not going to be presented with a hypothetical scenario. On the contrary, they will make causal attributions based on a real experience that they lived for a semester. Also, it is important to find out if causal attributions are placed in the same location in the causal space by students. Different perceptions of the properties of a causal attribution lead to different motivation to learn (Kozminsky & Kozminsky 2002, p.88). In addition, different attributional styles detrimental to motivation require different interventions.

The researcher hopes to reach new understanding of motivation by dividing students' achievement outcomes into more strata than just success and failure. The researcher believes that globality as a fourth causal dimension might have a role in determining the future success of students in subject areas similar to the one under focus or in different subject areas. Some researchers who studied

attribution theory in achievement contexts suggested that despite Weiner's (2000, p.4) confirmation that there are only three causal dimensions further possible dimensions should be investigated, especially globality (Dresel et al. 2005, p.11; Elliot and Dweck 2005, p.191). Attribution retraining programmes can take different paths if there is evidence that globality as a fourth causal dimension exists and it is not ignored. Also, the investigation should not be limited to the causal dimensions of attributions, but the type of causal attributions should be considered, especially they are supportive or obstructive to motivation in achievement contexts. Furthermore, the researcher wants to investigate whether the magnitude of causal attributions play a role in predicting future achievement outcomes in similar tasks. That is, not only locating a causal attribution in the causal space is important, but classifying it as supportive or obstructive, and determining its magnitude are important as well.

The researcher intends to investigate the cognitive and emotional consequences resulting from causal properties and whether or not they can help in predicting future achievements outcomes in subsequent similar tasks and whether or not they relate to the determinants of the expectancy-value framework of motivation. So far, the literature review established the background essential to the present study. It encompassed what has been written and discovered about motivation in achievement contexts from an attributional perspective. A major aim of the present study is to make contributions to this literature.

CHAPTER III

METHODOLOGY

Research Objectives

The list of objectives below was prepared to study the motivation of business computing students from an attributional perspective in order to understand why they achieved as they did in an introductory computer programming course.

1. To develop some knowledge of motivation in learning computer programming from an attributional perspective at the undergraduate level in a Lebanese setting.

2. To identify the causal attributions of students learning computer programming and how students come to identify them.

3. To identify how students from various strata of achievement outcomes perceive the underlying properties of causal attributions and the influence they have on motivation for learning any similar subject.

4. To verify whether the causal dimensions of attribution theory map well with the determinants of the Expectancy-Value motivation model as proposed by the original attribution theory model.

5. To fill in a gap in the existing body of knowledge concerning the motivation of students learning computer programming.

Research Questions

Based on existing knowledge presented in the literature review chapter and the research objectives above, the following research questions are developed to guide the study (Creswell 2003, p.105; Hays 2004, p.226):

1. What are the causal attributions of achievement outcomes in computer programming made by business computing students?

2. How did business computing students come to identify the reasons that caused their achievement?

3. What are the underlying properties of causal attributions of business computing students' achievement outcomes in computer programming with regard to causal dimensions: locus of causality, stability and controllability?

4. How does the stability dimension influence motivation and relate to students' expectations of future success?

5. How do the locus of causality and controllability dimensions influence motivation and relate to the value determinant of motivation?

6. What actions will students take on computer programming courses in the future from an attributional perspective?

Six research questions is a reasonable number (Gillham 2000, p.67; deMarrais 2004, p.62; Hays 2004, pp.226-7). The first research question was developed to identify and explore causal attributions of achievement outcomes in CP1 with the aim of fulfilling the first part of the second research objective. The second research question was developed to study cues students use to identify causal

attributions with the aim of fulfilling the second part of the second research objective. The third research question was developed to determine the properties underlying causal attributions as perceived by participants themselves with the aim of fulfilling the first part of the third research objective. The fourth and fifth research questions were developed to verify whether the causal dimensions of attribution theory map well with the determinants of the Expectancy-Value motivation model with the aim of fulfilling the fourth research objective. The sixth research question was developed to determine how students' perceptions influence expectations and subsequent behaviour from the attribution theory of motivation and emotion perspective with the aim of fulfilling the second part of the third research question (Gray 2004, p.127). The order of the six research questions followed the motivational process from an attributional perspective as suggested by Weiner (2000, p.3). By answering all research questions, some knowledge of motivation in learning the computer programming subject will be gained and the first objective of this investigation will be fulfilled. Furthermore, the success of the present research will eventually lead to fulfilling its fifth objective. The research questions as framed not only set the study's focus, but also define the boundaries of its upcoming stages, especially the process of collecting relevant data (Eisenhardt 2006, p.301).

Qualitative Epistemology

Learning from business computing students themselves what they have constructed about their motivation from an attributional perspective is the basis for the understanding that this research seeks to provide. The study starts by listening to students about their lived experiences when they received their grades in the Computer Programming 1 (CP1) course (Prior 2004, p.90). Qualitative research is best fitted for this study since precise and substantial descriptions of the students' experiences from their own point of view are needed (Flick et al. 2004, p.4; Denzin and Ryan 2007, p.578). This route has the support of some

researchers who concluded after the use of a simple open questionnaire in a study that investigated success and failure from an attributional perspective that a 'more in-depth interpretive research, possibly employing interviews to gain deeper understanding of the underlying reasons for learners' attributions, would certainly seem to be warranted' (Williams et al. 2004, p.27). Students' views cannot be detached from their unique and well-defined context (Ary et al. 2006, p.453) and they cannot be quantified (Gillham 2000, p.11). The thick descriptions emanating from subjective constructions of achievement outcome generate stocks of words which are qualitative evidence (Eisenhardt 2006, p.301).

The attributional approach of this study and its research questions necessitate the use of two different approaches to analyzing the interview data. While the first analytical approach is quantitative content analysis, the second analytical approach is qualitative content analysis (Krippendorff 2004, p.96). Both analytical approaches used are based on organizing data into categories and subcategories.

The first analytical approach is distinguished by the use of textual and numeric coding and tabulation to represent the voluminous data spoken by participants to the reader (Krippendorff 2004, p.192). With this approach, interview data is represented by codes, made of single words or two or more words, in table cells. Gibbs (2007) refers to a table that contains text as a qualitative table (p.78). The best way to preserve and represent relationships in this data is in a structured way by using a table row for each participant. Other qualitative researchers use frequency counts and tabulations too (Silverman 2006, p.161).

A table can group participants who make the same causal attribution or who belong to the same achievement strata. It can represent data about these participants such as CP1 outcomes, causal properties, expectations of future success, and CP2 outcomes into 'analyzable representations' (Krippendorff 2004, p.82). Gibbs (2007) posits that 'qualitative tables are a convenient way to display

text from across the whole dataset in a way that makes systematic comparisons easier' (p.78). With tabulation, not only comparisons become possible between participants who experienced the same theme, but the exploration of relationships between stages of attribution theory becomes possible too.

A table can give an idea of the frequency of occurrence of each causal attribution (Kvale 2007, p.105), and allows at a glance the identification of causal styles that might lead to high or low achievement (Darlington and Scott 2002, pp.150-1). It also determines how well causal properties relate to the determinants of the Expectancy x Value motivation model (Gibbs 2007, p.39). The latter could lead to a major finding that might lead to a change in the attribution model to produce one that better explains motivation in learning computer programming in the study's sample.

Most researchers and authors refer to the dominance of ability and effort as causal attributions, or to that most participants perceived their causes as external. Such claims are not possible without frequency counts. In this study, counting is needed to find the number of instances of a key theme such as a causal attribution or a sub theme such as a causal antecedent. Such counts will be used in ranking, within the sample, emerging causal attributions and causal antecedents. Also, counting helps in getting an idea of the proportion of a group of participants who cited a particular theme or a sub theme relative to the sample size. Furthermore, frequency counts are used to enrich the description of the sample's profile and to simplify the comparison of the sample with larger populations in which it is embedded, such as the computer science department population. The analysis of rankings and comparisons should end with contextual interpretations.

A set of categories for key themes and sub themes will be developed guided by Weiner's (2000) attribution model, but rooted in the collected data (Adler and Clark 2008, p.292). Krippendorff (2004) writes 'categorizing textual units is considered the most elementary form of measurement' (p.87). An example of a

category that might emerge from Weiner's model is 'causal antecedents'. An example of a category that fits the research objectives is 'CP2 outcome'. Subcategories are expected to emerge too (Kvale 2007, p.105). Furthermore, the search for causal attributions in participants' answers will not be limited to those which appeared in the original model put forward by Weiner (2000) such as ability, but hopefully it will uncover new themes. The major strength of the first analytical approach is its usefulness in meeting the research objectives based on data collected using interviews (Kvale 2007, p.103). With this approach, Weiner's (2000) influential work retains its vividness because it helps in producing findings rooted in context and related to the computer programming topic. The quantitative content analysis nature of the first approach serves the exploratory aspect of this case study (Kvale 2007, pp.105-6).

At this point, it is important to note that the quantitative content analysis approach whose backbone is the quantification of qualitative data is a relatively uncommon approach to the analysis of qualitative data. The main reason for this is that the quantification of qualitative data might cause a potential loss of more nuanced interpretations which might result from a more traditional approach to the analysis of the interview data. Another reason is that tables representing interview data that are produced by this approach, as described above in this section, might not be easy to read by people other than the researcher and knowledgeable readers. Thus, there is a need for a second analytical approach where case studies are employed to provide in-depth examination of the interview data. In addition, each case study will serve the purpose of exemplifying some of the 'quantified' categories that emerge from the main analysis. The remaining paragraphs in this section will elaborate more on this need.

The second analytical approach is displayed in the use of two case studies. In each case study, the researcher reports extracts from interviews to examine and demonstrate all the phases of attribution theory that two participants went

through. The phases of attribution theory start with the receipt of CP1's achievement outcome and ending with CP2's achievement outcome.

This analytical approach will show participants' words as quotations that they said in response to the research questions and their related probes. Readers will be able to follow the happenings of each interview, starting with the making of a causal attribution following the receipt of CP1 outcome, passing through its underlying causal properties as perceived by the participant, the type of cognition that was triggered, the emotions that were felt, the effect of those cognitions and emotions on subsequent behaviour, and ending with the achievement outcome following the completion of the second course in the sequence (Gibbs 2007, p.39). The two case studies will not only illustrate two plausible paths between achievement outcomes in a computer programming course and behavioural consequences of motivation, but they will be followed by a detailed discussion explaining the motivation of the concerned participants from an attributional perspective. The qualitative content analysis nature of the second analytical tool serves the explanatory aspect of this case study.

Role of researcher

The researcher has established good rapport with many business computing students through his roles on campus. Empathy has been established between him and his students (Anderson 1998, p.196) which makes the study subjective. The subjective nature of the researcher's role affects data-collection, organization, analysis, and synthesis (MacDonald and Walker 2006, p.114). Being human, a researcher conducts research through available senses which affect every aspect of the research process. However, this involvement is expected and acceptable (Lichtman 2006, p.206), and should not be eliminated (Flick et al. 2004, p.8). Flick (2006, p.16) posits that 'the subjectivity of the researcher and of those being studied becomes part of the research process.'

The researcher in this study is the primary instrument of data-collection (Ary et al. 2006, p.453). As interviews are conducted, he has to actively listen to the meanings students construct about their achievement (Anderson 1998, p.195; Gillham 2000, p.10). He assumes the role of the learner (deMarrais 2004, p.57). Then, he will be the one who analyses the data. These processes are important characteristics of qualitative research (Merriam 2001, p.7). Reducing the bias brought into those processes will be achieved through triangulation of data sources. However, reducing the so-called researcher's bias is deemed unnecessary in qualitative research because the impact of personal and situational factors is unavoidable (Lichtman 2006, p.13).

The researcher is neither an intruder nor an interventionist. His other roles, as a teacher and advisor, are acceptable in qualitative research (Stoecker 2006, p.342; Denzin and Ryan 2007, p.582). Being the teacher and advisor to business computing students has its advantages (Anderson 1998, p.156). First, the researcher does not have to spend much time learning about the context and the students. Second, participants will not refrain from revealing their experiences as they have lived them in responding to the research instrument, which is made up of open-answer format research questions, because most of the participants and the researcher have developed mutual trust through the time they have spent together in advising, teaching, and learning (Flick 2006, p.113). Truthful views and perceptions validate the interview-situation (Steinke 2004, p.185).

Access to people in educational settings is usually a long and challenging process (Mertens 2005, p.324). However, being an insider facilitates that as well as obtaining data as the need arises at different phases of the study. Still, the familiarity of the researcher may raise ethical issues pertaining to anonymity, confidentiality, and risk of harm. Those ethical issues are shaped by the researcher's built-in code of conduct (Kvale 1996, p.117). Trust has been established with students in this context.

Ethical Protocol

The major threat to qualitative research is its liability to ethical risks (Hopf 2004, p.334). As part of the researcher's commitment to make this study successful, an ethical protocol is prepared to face the challenges of anticipated ethical problems that can occur at every step of the research. The ethical protocol as such safeguards the interests of all participants in the study (Fontana and Frey 2005, p.715). It is developed and discussed in relation to gaining access, gaining participants' consent, selecting participants, anonymity and confidentiality, risk of harm, and accuracy of data (Tisdale 2004, p.21; Flick 2006, p.49).

Gaining access

The data-gathering process was preceded by permission procedures to conduct the research and to gain access to students' official records (Flick 2006, p.115). The first step entailed gaining the approval of MSU's Research Board (Cohen et al. 2000, p.98). The board had no objection because the researcher is a faculty member and recommended that the researcher should inform his department about the study's details. For his part, the chairperson had no objection and expressed his belief that the research was important for the computer science department. A written request, approved by the faculty's dean, was addressed to the Registrar to obtain data from the students' official records (Anderson and Arsenault 1998, p.125). As a result, the Division of Computer Services generated a complete list of all business computing students who took the 'Computer Programming 1' (CP1) course, their identification numbers, names, genders, ages, letter grades, and current academic levels. The approval of the administration university legalized the work of the researcher (American Psychological Association 2001, p.391) and provided some protection (Tisdale 2004, p.29). As the researcher proceeded with the study, safeguarding participants' interests became his responsibility (Flick 2006, p.119).

Gaining participant's consent

Participants were fully informed about the reasons for being invited to a research interview (Case 2002, p.172; Ciambrone 2008, p.43). They were provided with a one-page informative letter (see Appendix A) before engaging in the interview (Christians 2005, p.145). The letter stated clearly that participants had the right to refuse to answer sensitive questions and to quit anytime they felt they wanted to during the interview (Robson 2000, p.31; Ciambrone 2008, p.45). These measures ensured that potential participants did not feel forced to be interviewed (Cohen et al. 2000, p.245; Tisdale 2004, p.27). Participants were able to understand and reflect on what they read on the letter (see Table 3.2, p.93). All students who read the letter chose to participate and signed it as an indication of approval (Neuman 2003, p.124).

Anonymity dictates that participants' identifiers should not appear on information they reveal (Robson 2000, p.32; Neuman 2003, p.127). However, the researcher needs to contact his interviewees to clarify meanings, check out data for accuracy, confirm interview transcriptions, or to examine official records if interviewees give consent. Conflict arises between ethical calls for keeping participants' identity anonymous and the need for participants' names or identification numbers. The researcher resolved the conflict by promising not to reveal participants' real identities (Mertens 2005, p.337; Adler and Clark 2008, p.53). Furthermore, excerpts from interviews were quoted, but interviewees' names were replaced by numbers (see p.112) (Christians 2005, p.145). This measure protects participants from being identified by their peers as well as by the outside world (Flick 2006, p.50). Confidentiality can be an issue for some participants. The open-answer format of the research questions might lead to the disclosure of sensitive information on subjects such as cheating on exams, using drugs, or misbehaving teachers. The researcher will keep such private information confidential.

The researcher protects interview sound files and their back up copies, interview transcripts, forms containing participants' demographic information, and files containing data retrieved from university records by keeping them in a safe place (Mertens 2005, p.327; Flick 2006, p.50). This way the information contained in all these mediums is kept confidential (Robson 2000, p.32). However, the researcher reserves the right to use the findings of data analysis. Participants were informed of their right to look at the findings should they show interest.

Participants will not be harmed (Tisdale 2004, p.21) whether physically or psychologically (Case 2002, p.171; Neuman 2003, p.120). Physical harm is not possible in this setting. However, psychological harm may affect participants during the flow of interviews (Flick 2006, p.50). Feelings of embarrassment may develop as inner meanings or emotions are revealed (Merriam 2001, p.214). In such cases, participants will be helped to get out of unfavorable situations (Gomm 2004, p.314). The interviewer will allow participants to abstain from answering a provocative question. Mental discomfort can be manifested by a sudden decision to quit. The interviewer will not object, in fulfillment of the promise made in the letter of informed consent. Interviewer and interviewee will decide what to do with the recorded part of the interview.

Accuracy of data

Finally, under no circumstances will the researcher fabricate or omit any data. Such unethical acts jeopardize the trustworthiness of the study (Christians 2005, p.145). Such acts are against the researcher's morals.

Case Study – Methodology

There are several varying case study definitions (Stoecker 2006, p.333; Platt 2007, p.111). A good concise description of case study design is offered by author Creswell (2003). Case study is a method:

> ‘in which the researcher explores in-depth a programme, an event, an activity, a process, or one or more individuals. The case(s) are bounded by time and activity, and researchers collect detailed information, using a variety of data-collection procedures over a sustained period of time’ (Creswell 2003, p.15).

Other authors agree that case studies closely investigate people, topics, issues or programmes (Hays 2004, p.218) to obtain in-depth understanding (Jocher 2006, p.42) in a real-life context by using different sources of evidence (Gray 2004, p.129; Gerring 2007, p.17). Bassey (1999, p.47) writes that ‘case study is study of singularity conducted in depth in natural settings.’

Types of case study

Writers classify case studies in several ways. A common way is based on studies’ goals whether descriptive, interpretive, theory building, or evaluative (Merriam 2001, pp.38-40; Eisenhardt 2006, p.297). The types of research questions in this study make it a combination of explanatory and exploratory case study. Explanatory case studies are thought to be the same as theory-testing (Bassey 1999, p.62). This study is, in a way, testing attribution theory (Platt 2007, p.112). Even critics of case study method believe that it is safe to be used for exploratory purposes (Stoecker 2006, p.328; Gerring 2007, p.39).

Case studies can be categorised as intrinsic, instrumental, and collective (Stake 2005, pp.445-6). The current case study is intrinsic because it is conducted for a special interest in the stated problem (Silverman 2005, p.127; Stake 2005, p.445). It is not conducted to achieve a general understanding beyond its boundaries, so it is not instrumental (Stake 2005, p.445). If work is coordinated in carrying out more studies on similar cases, the work becomes collective (Stake 2005, p.445; Platt 2006, p.276). In addition, the number of cases can be used as a reference to distinguish between case studies (Yin 2003, p.40). The current study covers just one case and therefore it is labelled a single case study (de Vaus 2004, p.226).

Moreover, this case study is considered retrospective rather than prospective because each sub-unit is studied on the bases of a past achievement outcome of an accomplished course (de Vaus 2004, p.227). Researchers have been focusing on two measures of academic achievement: cumulative grade point average (GPA) and single course grade (Ridgell and Lounsbury 2004, p.1). It is also considered cross-sectional because it is studying people in a cohort at one time (Neuman 2003, p.32).

The appropriateness of a case study in this context

The present research falls under the rubric of case study. First, the investigator should define clearly the phenomenon under study (Stake 1995, p.2; Yin 2003, p.23). It is an investigation into the motivation of business computing students based on their success and failure in a computer programming course. The clear purpose and the literature review helped the researcher pose focused research questions (Yin 2003, p.9), which in turn helped in gathering relevant information about every participant (Yin 2003, p.23). Stake (2005, p.443) posits that 'case study optimizes understanding by pursuing scholarly research questions.'

Second, the study is taking place in a real-life and naturally occurring situation (Stake 1995, p.134; Hammersley and Gomm 2000, p.3) portrayed by the business computing cohort in a computer science department at a Mediterranean university. Third, it is contemporary (Merriam 2001, p.27; Hays 2004, p.218) since it is building an understanding of an educational issue starting year 2001 (Gerring 2007, p.19) from an attributional perspective which is a contemporary theory. The study sheds light on living people, and the way they think and feel about a particular issue including the researcher (Stoecker 2006, p.344). Fourth, attribution theory is based on cognitive and affective processes which require an in-depth exploration at all its stages (Merriam 2001, p.19). Fifth, the in-depth exploration requires more than one source of data and the study will rely on qualitative interview and examination of students' records.

Sixth, this study is unique because it investigates achievement outcome in a contemporary subject, computer programming, using the most recent development tool, through a popular theory of motivation for a modern programme of study that is deeply rooted in context, and bounded by space and time (Yin 2003, p.13). The case has been a bounded system (Platt 2006, p.275). It has clear-cut geographical and institutional boundaries (Gerring 2007, p.19). At the same time, the study can not be isolated from its larger context. Finally, it is bounded by thesis time (Hays 2004, p.226). Otherwise, by the time participants are selected, newer students could be included should they complete their computer programming course. The preceding discussion shows that case study as a method (Platt 2007, p.111) is suitable for the current research based on the cited definition and the statements that supported it.

Writers on case study mention more criteria that should be met by a piece of research to be done as a case study. First, the number of cases should be small (Hammersley and Gomm 2000, p.3); but what is a case? The cornerstone in conducting a case study is the definition of a case in the context of research (Merriam 2001, p.27; Hays 2004, p.226). In a case study, a case can be a programme, an event, an individual, or a group of people (Neuman 2003, p.33; Yin 2003, pp.22-3). In educational settings, a case can be a student, a university, or all the departments of computer science in a country (Gerring 2007, p.19). In this study, the case is the group of business computing students who took the introductory computer programming course (Gillham 2000, p.1; Yin 2003, p.22). This cohort is a self-contained entity (Stake 2005, p.444). A student is an individual within the cohort, a sub-unit (Merriam 2001, p.40). Hence, the first criterion has been met.

The second criterion focuses on the type of research questions. The researcher was seeking causal attributions that can be discovered by “why” or “how” questions (Graham 1991, p.6). The use of the case study methodology to answer those explanatory types of research questions gains the support of many writers

(Anderson 1998, p.153). When "how" or "why" questions are being posed, the case study method is a 'preferred strategy' (Yin 2003, p.1), better yet 'ideal' with contemporary events (Gray 2004, p.124). It is preferred over histories and experiments which are also suitable to "how" or "why" questions, but not to this contemporary educational context.

Participants' cognitive and affective processes are not manipulated as could have been the case with an experiment (Gillham 2000, p.11). Events of success and failure are studied as they occur in their natural setting. The participants' learning experiences and interpretations cannot be isolated from their context. Social and cultural backgrounds will always have their influence on investigations and their results (Flick 2006, p.13). Causal attributions, emotions, motivation, and achievement strivings cannot be measured or quantified. The intention is neither to isolate variables nor to formulate a general law (Lichtman 2006, p.13). There is a focus on understanding specific events from a particular perspective as perceived by the main characters involved in them. The specificity of the case, the complexity of the attributional theory of motivation, and the multiplicity of plausible paths between events and behavioral consequences, make research questions impracticable to operationalise into variables (Turner 2007, p.123). There is no room in this research for experimental manipulation. It is the type of educational research that requires an adaptable design such as case study (Anderson 1998, p.152). Increasingly, some authors express their disappointment with the methods and findings of the sciences, especially the social sciences (Turner 2007, p.123). The main reason for this disappointment is 'the low degree of applicability of results and the problems of connecting them to theory and societal developments' (Flick 2006, p.13).

This research does not depend primarily on documents and it is not an intervention (Stake 1995, p.44). It consists of collecting students' perceptions about their achievement outcome. In addition to explanatory research questions, the list of research questions included exploratory questions that started with

'What'. Such questions can be used in a wide variety of research types including case study (Yin 2003, p.6). However, case study is preferred over other strategies such as survey because with case study researchers can pose questions that require subjective answers from student participants and can probe into them (Stake 1995, p.64; Jocher 2006, p.43). The purpose of a single case study can be explanatory and exploratory (Yin 2003, p.3; Stake 2006, p.129). It can be safely concluded that the research questions' types of this study make doing a case study favorable.

Another criterion should be met in order to do a case study, namely the specificity and clarity of the issue under focus (Hays 2004, p.225; Stake 2005, p.444). This investigation is not undertaken to examine all happenings pertaining to the case or to each sub-unit. The issue under focus is much narrower. Furthermore, the issue of motivation is studied from a precise angle bounded by the stated research questions that were defined based on attribution theory of motivation. Each research question focused on the gathering of data pertaining to a point in the theory. The process departs from a past event, success or failure in an accomplished course. Each participant brings into the investigation uniqueness by reflecting retrospectively on that specific event guided by the research questions. Looking backwards at events could be a source of bias (Stoecker 2006, p.328), one that can be resolved by triangulation (Stake 2005, pp.453-4).

The present research as a case study is appropriately embedded in both a well-defined real-life achievement context and a contemporary attribution theory framework. Many authors support using case studies in educational contexts (Burns 2000, p.459; de Vaus 2001, p.219). Further, case studies are thought suitable for studying mediators between stimulus and response, as is the case with attribution theory (Hammersley et al. 2000, p.234). After showing that this research fits in well with the cited definitions of case study and that it meets many criteria set by case study authors, the focus shifts to determining the type of this case study.

Case study design

A case study is neither a separate research paradigm nor a subset. It is a research method (Gray 2004, p.123; MacDonald and Walker 2006, p.113; Platt 2006, p.274). Stoecker (2006, p.325) argues that it is not even a method because it lacks sophistication. In fact, case studies as research methods have no common standard design (Merriam 2001, p.28; Yin 2003, p.10), a distinctive aspect that offers an opportunity to structure a research design appropriate to the investigation at hand.

The emphasis on a thorough search for information in the case study definitions does not make all case studies interpretive research (Yin 2003, p.14). Still, qualitative data are the type that many case studies collect (Hammersley and Gomm 2000, p.3; Hays 2004, p.219), especially in education (Merriam 2001, p.19). This study necessitates the gathering of perceptions, meanings, interpretations, and emotions which fall into the category of qualitative evidence. They are needed to understand students' motivation by shedding light on the various stages of attribution theory.

Nevertheless, there are researchers who follow a quantitative approach in doing case studies (Merriam 2001, p.19; Bryman 2004, p.49; Platt 2006, p.274). This case study relies on some quantitative data too, but the qualitative data in it exceed it by far. For instance, the attributional perspective necessitates the use of students' grades. Nevertheless, to strengthen the credibility of qualitative data obtained from participants, the researcher will examine participants' records (Gillham 2000, p.7), after gaining their approval. Both types of data can be employed in case study (Hays 2004, p.219; Eisenhardt 2006, p.301; Stoecker 2006, p.335). A qualitative case study method is suitable for the understanding of this unique educational setting (Stake 1995, p.16; Denzin and Ryan 2007, p.580). The uniqueness of this case may lead to unexpected findings, even though it is bounded by a well-established theoretical framework (Platt 2006, p.294).

Case study designs are not constrained to particular data-collection methods (de Vaus 2004, p.231; Stoecker 2006, p.333). In general, qualitative case study researchers have been using a combination of interviews, documents and records, and direct observations as data sources (Yin 2003, p.85; Gray 2004, p.129; Hays 2004, pp.228-30). Using more than one data-collection method gives strength to case study research (de Vaus 2004, p.231). The interview method can answer the study's research questions and has the capacity to collect qualitative data (Stake 1995, p.50; Bassey 1999, p.81; Yin 2003, p.89). Using the interview method is common to case studies (Kvale 1996, p.98). Examination of students' official records will be employed for triangulation (Cohen et al. 2000, p.112; Creswell 2003, p.15). Triangulation provides credence for the data gathered by interview (Silverman 2005, p.121). Wherever document review shows discrepancies, participants will be requested to make necessary clarifications. This process of data validation helps in deriving coherent findings (Creswell 2003, p.196). Using more than one data-collection method as a result of adopting a case study approach is an additional advantage (de Vaus 2001, p.231).

Case studies and generalisations

Critics of case study believe that a single case study offers no grounds for generalizing its findings (Hammersley et al. 2000, p.234; Yin 2003, p.37; Stoecker 2006, p.327). Some writers call for conducting multiple case designs whenever the objective is to generalize findings for a larger population (Stoecker 2006, p.329). However, this study is investigating a single case in its own right (Schostak 2006, p.21). It is nothing more than a particularization. Still, Stake (2006) believes that it does deserve praise (p.126). It is conducted for a special interest in resolving the problem under focus (Platt 2007, p.111). Therefore, the findings of this single case study cannot be generalized beyond cases comparable to the ones studied (Bryman 2004, p.52; Flick 2006, p.130).

Still, some researchers believe that the transferability of findings is possible, but the decision is left to the readers. That is, readers decide for themselves whether

the findings are transferable to similar contexts under their investigation (Stake 2006, p.128). The researcher facilitates transferability by providing readers with 'thick description' (Geertz 1993, pp.6-7) of the study's context. Thick description is explained by Mertens (2005, p.256) as an 'extensive and careful description of time, place, context, and culture.' It is typical of qualitative researchers to approach issues under focus using thick descriptions (Flick et al. 2004, p.3). Indeed, a thick description was provided in the present investigation in the introduction chapter.

Credibility of the study

Mertens (2005, p.254) posits that credibility is a test that 'asks if there is a correspondence between the way the respondents actually perceive social constructs and the way the researcher portrays their viewpoints.' While participants articulate their subjective viewpoints, the interviewer construes their underlying meanings (Jocher 2006, p.46). Thus, interviewers cannot distance themselves from what interviewees reveal during conversations (Hermanns 2004, p.211). Interaction during interviews cannot be avoided (Holstein and Gubrium 2004, p.142). For instance, follow-up questions are posed based on the meanings constructed from listening to interviewees' interpretations. The interviewer might ask a follow-up question from several alternatives that are instantly conjured up in the mind. Consequently, an interviewer develops an understanding of the issue not necessarily in the same way as other people develop it. People are diverse and complex (Gough 2004, p.115). Further, subjectivity affects the degree at which this researcher succeeds in delivering his understanding to the people who will read his work. Some advocates of qualitative research do not consider blending researchers' own views in their investigations a source of threat to the credence of studies (Stake 1995, p.135). Still, a dependability audit will be conducted in order to safeguard the quality of the various research stages which will establish the study's credibility (Merriam 2001, pp.199-200; Tisdale 2004, p.16).

First, the researcher, as a complete participant in the case, has observed the issue under investigation for some years. He became convinced that the motivation of business computing students should be studied from a different perspective after the integration of new technologies and teaching methodologies. Second, the researcher went through 45 interviews from which old and new themes emerged (Mertens 2005, p.254). Third, interviewees were asked to examine whether or not their interview transcripts accurately reflected what they had said (Lichtman 2006, p.196). This process is known as 'member check' (Hays 2004, p.233), 'respondent validation' (Gomm 2004, p.188), and 'communicative validation' (Steinke 2004, p.185). It minimized any influence of the researcher's biases. Fourth, during the validation session the researcher asked for clarification of meanings, using additional probing questions or questions not posed at the first interview which increased the trustworthiness of the interviews. Fifth, methodological triangulation was used to validate as much as possible factual data generated by interviews, official records, and demographic forms (Gomm 2004, p.188; Stoecker 2006, p.328). One of the participants was removed from the study because he lied about his grade. He reported passing the course the first time with grade D when actually he failed. This participant was replaced by another from the same achievement level. Accurate data lead to trustworthy findings and analysis. Some authors believe that despite all attempts to ensure the credibility of qualitative studies, their success is determined only by competent readers (Matt 2004, p.330).

Construct validity is problematic in this context because of the difficulty of the constructs, related to attribution theory, used in the research questions (Gray 2004, pp.135-6). The pilot study helps determining whether these constructs will generate the knowledge required.

Pilot study

The pilot study was conducted during the fall 2006 semester. A preliminary version of the semi-structured interview was pilot-tested in a sample of 10

computer programming 1 students. It put to the test the interview method (Stake 1995, p.65; Gillham 2000, p.66). To construct trustworthy knowledge, the main focus was on the wording, order, and adequacy of the research questions. Ambiguous and difficult questions that produced replies irrelevant to the information required were reworded or replaced. In some cases, it was the participants who pointed out ambiguous questions (Glassner and Miller 2004, p.130). The final version of the semi-structured interview is reported in Appendix D. Follow-up questions were prepared to improve probing. After refinement, the research instrument was piloted again (Stake 1995, p.9). Also, the informed consent letter, the personal documents examination letter, and the demographic data letter were tried out.

The researcher stopped posing questions in English when he noticed that posing them in Arabic led to deeper and more detailed answers (Mertens 2005, p.385). The translated questions were tested to ensure they were reliable and consistent with the English-based questions. Further, towards the end of the interview, students were more into the issue and revealed more details. Most participants thanked the researcher for helping them to learn more about their learning experiences and wished that they had gone through this experience before. This was a strong indication that the research instrument was workable and appropriate for the context. The interviewees made the researcher understand that they felt they had been treated as humans and not as numbers as is the case with some in-depth interviewing (Fontana and Frey 2005, pp.715-6).

On the average, each interview lasted 30 minutes. Audio files were recorded on a laptop. The pilot study anticipated and resolved potential problems before they occurred in actual interviews. More importantly, the participants' feedback assured the researcher that the study is valuable to the community and made him eager to reach conclusions.

Number of interviewees

To provide insight on motivation in computer programming from an attributional perspective, participants from different achievement levels had to be interviewed (Merkens 2004, p.167). Accordingly, the population was divided into five strata: high achievers (A+, A, A-), good achievers (B+, B, B-), satisfactory achievers (C+, C), passing achievers (C-, D+, D), and low achievers (F, UW). This classification conforms to the study of success and failure, the main events that trigger ascriptions in attribution theory (Eisenhardt 2006, p.303). In addition, it ensures the inclusion of extreme and critical cases which allows identifying patterns that might be shared by various categories (Ary et al. 2006, p.473) and revealing the range of differentiation (Flick 2006, p.130). High and low achievers are extreme cases. Students who did not fail but passed the course with a below-average grade, i.e. passing achievers, are critical cases.

In qualitative research, there are no rules that help in determining the sample size prior to data-collection (Ary et al. 2006, p.472), but 'in a case study, the sample is small' (Gerring 2007, p.21). Table 3.1, p.87, was prepared to help in determining the number of participants that should be selected from each stratum based on the percentages of strata in the population (Tashakkori and Teddlie 1998, p.76). A sample of 45 students was believed to be suitable (Lichtman 2006, p.119). First, it ensures the gathering of a wide range of experiences (Flick et al. 2004, p.8). Second, given the amount of time available for the research, 45 in-depth interviews may produce a volume of data that can still be transcribed, validated, analyzed, and interpreted with quality (Ary et al. 2006, p.472; Platt 2007, p.111). While interviews were conducted, some themes started recurring, especially with high and good achievers (Mertens 2005, p.328). In fact, A+ and A are the same grade since each one is worth 4 points per credit. At the same time, the need arose to interview more than 6 students from the passing stratum in order to maximize what could be learned from them (Merkens 2004, p.168). As such, the actual number from each stratum ended up by being nine participants (see Table 3.1, p.87).

Table 3.1 Distribution of Participants by Achievement Outcome Level

	Percentage in Population			**Number of Participants in Sample Calculated from Percentage**			**Number of Recruited Participants**		
Achievement Level / Gender	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
High achievers	18.6%	5.7%	24.3%	8.4	2.6	11.0	7	2	9
Good achievers	17.1%	4.5%	21.6%	7.7	2.0	9.7	7	2	9
Satisfactory achievers	18.6%	1.9%	20.5%	8.4	0.9	9.3	8	1	9
Passing achievers	10.7%	3.0%	13.7%	4.8	1.3	6.1	8	1	9
Low achievers	19.4%	0.5%	19.9%	8.7	0.2	8.9	9	0	9
Total	**84.4%**	**15.6%**	**100%**	**38.0**	**7.0**	**45**	**39**	**6**	**45**

Methods of Data Collection

This section discusses the two data-collection methods employed in the study: interview and examination of students' official records.

The interview method

Students will be engaged in conversations (Holstein and Gubrium 2004, p.141) based on the study's research questions (Crotty 2003, p.13), to gain a depth of knowledge about attribution theory (Stake 1995, p.77; Merriam 2001, p.74). Interviews are known for their subjectivity and particularisation. Both aspects are central to understanding, but they come at a cost. They make case studies take a very long time (Stake 1995, p.45; Gray 2004, p.125), and prone to accumulation of vast amounts of data (Gray 2004, p.125) that are not easy to organise or analyse (Stake 1995, p.84). Given that this study is bound by length of time and limited resources, and that its data-gathering process has to be thorough, the participants' number becomes an important issue (Hammersley and Gomm 2000, p.2). The planning and preparation of interview includes selecting interview type, determining the interviewees' number, conducting the interview, and transcription and verification. Critiques of interview follow.

Some writers believe that qualitative research interview is not a scientific method. Microsoft Encarta's dictionary (2006) defines a scientific method as "the system of advancing knowledge by formulating a question, collecting data about it through observation and experiment, and testing a hypothetical answer". As such, an interview is not scientific because it does not collect data by observation or experimentation. However, advocates of the interview method believe that it "can produce scientific knowledge in the meaning of methodologically secured new and systematic knowledge" (Kvale 1996, p.61).

Critics find many faults with the interview method. First, they question whether the interviewer's level of skill can obtain relevant and deep meanings (Kvale

1996, p.13). Twenty years of teaching, training, and advising experience in education refined the researcher's communication and conversation skills, in the United Arab Emirates and in Lebanon. Particularly, the researcher has been conducting many job interviews each semester with undergraduate students in partial fulfillment of their English courses requirements. This long experience made the researcher a reliable interviewer capable of engaging his interviewees enough to reveal meaningful views and experiences (Merriam 2001, p.206).

Second, the interview method is labelled as a source of bias and misunderstanding (Holstein and Gubrium 2004, p.141). Commentators complain about the effect of the researcher's interaction with interviewees on the course of the interview. For them, as soon as the researcher assumes the interviewer's role, interviews become subject to bias. For instance, some interviewees may lie about or hide their perceptions (Ary et al. 2006, p.480) possibly because they are afraid of the researcher's control over them (Wooffitt and Widdicombe 2006, p.32). When perceptions are veiled, the construction of knowledge is impeded. However, this disadvantage plaguing interview chases the scientific method too (Stoecker 2006, p.329). Besides, the attempts to dissect the researcher from the research context defy real-life situations and hold back information from people (Stoecker 2006, p.332). Holstein and Gubrium (2004, p.141) offer simple advice: 'If the interviewer asks questions properly and the interview situation is propitious, the respondent will automatically convey the desired information.'

Third, interviews collect interviewees' first thoughts which can be biased or in error. Later on, interviewees regret revealing truthful meanings, telling stories, or forgetting events (Kvale 1996, p.116). This will be overcome by asking participants to review and correct their interviews by using the member-check technique. Fourth, critics believe that interviews are time-consuming for everyone who engages in them. The bright side here is that they generate valuable data.

The first stage in designing the interview consists of selecting its type. Two factors guide this selection: the purpose of the interview and its structure (Kvale 1996, p.4). Since the main purpose of the study is to explore students' learning motivation, the exploration requires open-answer format questions to allow for open responses such as views, perceptions, and experiences from an attributional perspective (Mertens 2005, p.386). Participants will be persuaded to freely talk about their experiences within the framework of research questions (Adler and Clark 2008, p.272). Views and perceptions will be followed up with more questions to confirm understanding (Kvale 1996, p.100), to probe for more details, or to find new leads (Merriam 2001, p.80; Wooffitt and Widdicombe 2006, p.29). Thus, semi-structured interview is the type of interview that is appropriate for this case study (Gillham 2000, p.65; Flick 2006, p.149).

Conducting the interview

The need for participants in this study was advertised on the BlackBoard e-learning system and in computer programming classes which led to a convenience sample (Tashakkori and Teddlie 1998, p.76; Adler and Clark 2008, p.123). Personal interviews were scheduled in collaboration with potential participants who agreed to cooperate. An interview guide was prepared that included the research questions and follow-up questions to ensure consistency in covering the main points with all participants (Merriam 2001, p.81; deMarrais 2004, p.61). Participants were told in brief about the research purpose and its importance, the research questions, the data-collection methods, the projected 30-minute interview time (Anderson 1998, p.193), the interview's location, and the interview's recording (Gillham 2000, p.69). Following the briefing, participants signed a letter of informed consent (Denscombe 2003, p.138) (See Appendix A) and filled a demographic data form for background information (Mertens 2005, p.185) (See Appendix B).

Since the research questions focus on participant's experience of a sensitive phenomenon, the interview's investigation became a source of agony for some

participants (Hermanns 2004, p.209). It happened to those who recollected painful memories. Such moments were handled with extreme care. In addition, interviews conjured up moments when interviewees mentioned new leads (Kvale 1996, p.100). The interviewer dug into the participants' revelations for more details or elaborations by further questioning (Hays 2004, p.229). Follow up questions were formed using participants' words (deMarrais 2004, p.57). Probing is a major strength of qualitative research interview because it may lead to uncovering inner meanings or new situations (Ary et al. 2006, p.481). Sometimes, the interviewer had to doubt a participant's belief in order to check its strength. Other times, he requested that a view should be retold because it sounded interesting or unclear (deMarrais 2004, p.62). Unclear views had to be checked. Otherwise, they could have lead to wrong interpretation (Stake 1995, p.45). The interviewer rephrased unclear views for approval (Kvale 1996, p.32). Also, he gave cues, as necessary, for interviewees not to stray off course (Scott and Usher 1999, p.110; deMarrais 2004, p.68).

While an interview was recorded on the computer's hard disk, the interviewer had time to examine nonverbal communication such as bodily gestures, facial expressions, and tone of voice. Suppressed feelings and emotions are sometimes revealed to some extent by nonverbal behaviours (Wilson 1985, p.11). The researcher used the caught-up non-linguistic behaviours for further probing as interviews progressed. However, only words were added to transcripts because professional transcribers using such systems of notation were not available. An advantage of this is that interviewees found it easy to read the transcripts (Kowal and O'Connell 2004, p.252).

A laptop was used to record each interview. The exact words of the interviewee and interviewer were saved straight into an electronic sound file. Saved conversions are highly accurate which gives credibility to the study (Peräkylä 2004, p.285). Participants expressed their ideas in Arabic. Some writers believe that there is no need to keep the exact words, but only the meaning (Stake 1995,

p.66). However, the meaning drawn out of words during an interview may possibly not be the same after the interview. So, it is important to record the exact words and listen to a rerun over and over again until the meaning is understood (Ary et al. 2006, p.481). Sound files were preferred over audiotapes because they were easier to replay, store, and manage.

Upon the interview termination, gratitude was expressed to the participants for their contribution. They were informed about reading and commenting on the interview transcript.

Transcription and verification

The researcher had no experience in pulling out participants' causal attributions from the sound files. Thus, all interviews were transcribed, using English, into plain text files (Munton et al. 1999, p.36). Trustworthiness of transcripts was established through the confirmation of their accuracy by the interviewees themselves because they had good English-language writing and reading skills (see Table 3.2, p.93). Most participants had finished at least ENL 213, one of their mandatory English language general education requirement courses. At a follow-up meeting, participants checked whether their statements were well represented on paper (Flick 2006, p.157). In addition, they were asked probing questions where previous answers were unclear or questions not posed. Some students could not but express their surprise at the accuracy of transcription. Several students commented "those are my exact words". Others praised the translation. Transcription errors were inevitable (Kowal and O'Connell 2004, p.249). They were corrected, but no amendments made to the meanings. Trustworthy transcripts enhance the credibility of the study.

Table 3.2, p.93, shows that all participants have bypassed by entrance exams the first remedial English language course ENL 109. In addition, only one student was enrolled in the second remedial English language course ENL 110. This indicates that participants had the appropriate English language level for

checking the accuracy of their interview transcriptions. The English language courses ENL 213 and ENL 230 must be taken by every student who reaches the sophomore level and has completed English remedial courses.

Table 3.2 Distribution of Participants by English Language Courses

Course Details		**Number of Students**	
Course Number	**Course name**	**Completed**	**Currently Enrolled in**
ENL 230	English in the Workplace	24	2
ENL 213	Sophomore English Rhetoric	36	3
ENL 110	Freshman English II for Science	5	1
ENL 109	Freshman English I for Science	0	0

Examination of documents

Documents form an important source of personal information (Prior 2004, p.91). In this study, all participants agreed to allow access to official records by signing a letter of personal documents examination (See Appendix C). Official records were used for triangulation and for obtaining additional data. Triangulation is achieved by using data in participants' records to confirm the authenticity of collected data using interviews and demographic forms (Silverman 2005, p.121) which can give credibility or trustworthiness to the case study (Mertens 2005, p.426; Stake 2005, p.443). Ensuring the credibility of a study increases the confidence of readers in its findings (Ary et al. 2006, p.504).

Students' identification numbers, names, academic programme, ages, enrolment in computer programming 1 (CP1) course, letter grades, academic levels, and achievement outcomes in other courses taken simultaneously with CP1 were all verified (Flick 2006, p.248). The examination of records was a good methodological triangulation. To some extent, it showed how accurate are the

views produced by the interviews and it corroborated data produced by demographic forms (Yin 2003, p.87). Further, participants' status and grades in the next course in the computer programming sequence (CP2), and remedial and general requirements English courses were dug out. These grades were needed to compare each student's current achievement with that of the following course, and to determine whether or not the level of English language proficiency of each participant allowed the validation of transcripts. CP2 grades were added to students' text files that contained interview transcriptions (Gray 2004, p.130).

Although triangulation is thought to increase confidence in findings, recently its usefulness has been under fire. Flick (2004, p.179) wrote that 'triangulation is seen less as a validation strategy within qualitative research and more as a strategy for justifying and underpinning knowledge by gaining additional knowledge.' Some researchers share with Flick (2004) the same point of view (Steinke 2004, p.185).

Data Analysis Plan

Data from transcripts, students' records, and demographic forms were organized in one plain text file for each participant. All 45 text files were stored in one folder, which was backed up. While each textual source file was read through carefully using HyperRESEARCH, codes were assigned to parts whose meanings fell within the research-questions framework (Stake 1995, p.72). Identifying causal attributions using textual source files was rather easy (Munton et al. 1999, p.36). Then, additional words were introduced into codes that belonged to the same category. For instance, codes in lines 1 to 4 in Appendix E were renamed to start with 'Academic level'. In all, 168 codes were created. Experts in attributional coding posit that despite the time and effort required to code naturalistic data, more insight is gained about causal attributions, psychological consequences, and subsequent behaviour by avoiding hypothetical scenarios

(Munton et al. 1999, p.66). The HyperRESEARCH study file was backed up and both copies were kept in a safe place. The use of computer programs to analyze qualitative data have been gaining momentum (Mertens 2005, p.421) mainly because they permit fast management and handling of volumes of data (Silverman 2005, p.189).

Themes were derived from recurring patterns in the entire set of source files (Hays 2004, p.232). They were matched with those of attribution theory such as causal attributions and their underlying properties (Gomm 2004, p.189, Gray 2004, p.139). Mertens (2005, p.422) argues that in qualitative data analysis 'the main analytic process is comparison.' Some themes emerged compatible with the purpose and theoretical framework of the study. Other themes stood out as being new. Unexpected themes or single instances were analysed carefully (Hays 2004, p.232). Some were particular to the present context, to the subject matter under focus, or to individual cases. Data that wandered off topic were discarded (Stake 1995, p.76). Related data such as a causal dimension and its dependent emotions as perceived by each participant were synthesized and tabulated to discover patterns and to depict data linkages to the reader. Then, discussions followed to compare the research findings with those presented in the literature review.

CHAPTER IV

FINDINGS

Profile of Participants

The sample for this study consisted of students who graduated from, or were enrolled in the business computing programme in the computer science department at a Christian university in Lebanon. The computer science department offers five programmes at the undergraduate level, which lead to Bachelor of Science degrees in business computing, computer science, computer information systems, computer graphics and animation, and geographical information systems. In addition, it offers two graduate programmes that lead to Master of Science degrees in computer science and computer information systems.

Typical 'Computer Programming 1' class compared to larger populations

The study's interviews were conducted in the spring 2007 semester. At that time, the 'Computer Programming 1' (CP1) class formed 23.5% (28 out of 119 students) of the business computing programme's population, which in turn formed 35.4% (119 out of 336 students) of the computer science department's population. The latter formed 8.5% of MSU's population (3947 students).

Sample size compared to larger populations from fall 2001 to spring 2007

The sample consisted of 45 students who took the CP1 course any time between the fall 2001 and the spring 2007 semesters. The sample size formed 13.2% of the business computing programme's population. However, without the four

volunteering graduates, the remaining 41 participants constitute 34.4% of the 119 enrolled students in the spring 2007 semester. The business computing programme's population from the fall 2001 to the spring 2007 semesters formed 36.8% of the computer science department's population, 1.4 points higher than that of the spring 2007 semester. During the same period, the number of computer science department's students formed 10.5% of MSU's main campus population, two points higher than that of the spring 2007 semester.

Sample compared to larger population by sex

The sample was predominantly male (see Chart 4.1 below) as was the population of the business computing cohort (see Chart 4.2 below). The male and female percentages were almost identical between the business computing and computer science department (see Table 4.1, p.98). Six female students participated in all (see Table 4.1, p.98). No low achiever female was able to participate in this study. This left females unrepresented in the low achievers strata of the sample, the reasons of which will be presented next.

Chart 4.1: Distribution of Participants by Sex

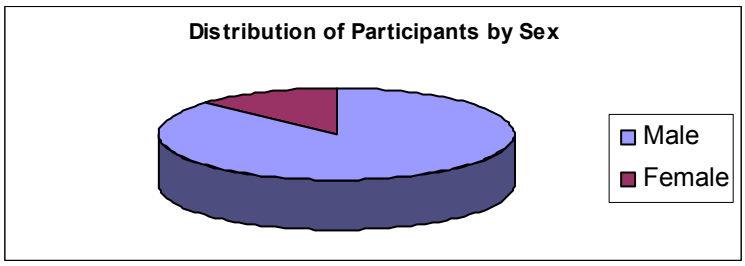


Chart 4.2: Distribution of Population by Sex

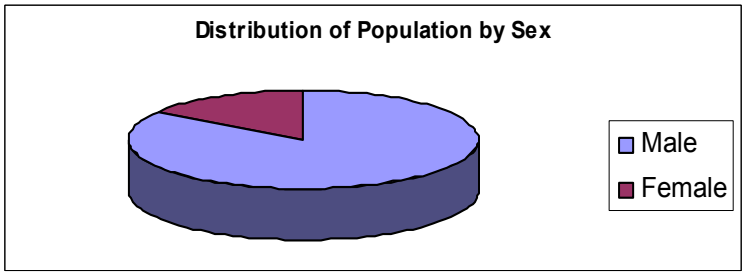


Table 4.1: Sample vs. Larger Populations by Sex – Fall 2001 to Spring 2007

	Sample		BC Programme		CS Department		University	
Sex	**Count**	**Percent of BC Programme's Population**	**Count**	**Percent of CS Department's Population**	**Count**	**Percent of University's Population**	**Count**	**Percent**
Male	39	86.7%	287	84.4%	775	84.0%	5553	63.7%
Female	6	13.3%	53	15.6%	148	16.0%	3171	36.3%
Total	45	100.0%	340	100.0%	923	100.0%	8724	100%

Representation of female low achievers

To locate and contact the female students who failed CP1, a request was submitted to the computer services at MSU through the registrar's office for a search to be conducted by semester. The search led to identifying a mistake in the Division of Computer Services' report. A female was reported failing in the fall 2005 semester, but actually she withdrew from the course. The finding was triangulated with the student information system, an electronic database provided by MSU that contains student information, which confirmed the mistake. This was the only mistake that the researcher identified in the report. An explanation of this inaccuracy was sought from the Division of Computer Services, which acknowledged the mistake after inspection. It was the result of a logical error in the query written to retrieve the data from the database. The final number of female failures was 3. No other mistake was detected. After correction, the search returned the data in Table 4.2 below.

Table 4.2: Numbers of BC Females by Semester – Fall 2001 to Spring 2007

Year	Semester	Total Students	Female Students	Females Percent	Failing Females	Graduated/ Dropped out
2001	Fall	26	6	23.08	0	6
2002	Spring	44	10	22.73	0	10
2002	Fall	50	7	14.00	0	7
2003	Spring	37	5	13.51	0	5
2003	Fall	38	6	15.79	0	6
2004	Spring	29	3	10.34	2	3
2004	Fall	27	4	14.81	1	2
2005	Spring	20	1	5.00	0	1
2005	Fall	13	1	14.29	0	1
2006	Spring	21	2	9.52	0	0
2006	Fall	15	2	13.33	0	0
2007	Spring	27	1	3.70	0	0

The females who failed the course in the spring 2004 semester were tracked down, starting with the teacher's records. One of the two females, Sandra (pseudonym), failed the course twice in the spring 2004 and the fall 2004 semesters. However, the investigation of Sandra's electronic records indicated that she passed the course with a D in the spring 2002 semester. She took the course again to improve her grade, but failed twice. Her first grade D belonged to the passing achievers strata, but she was not one of the nine students who showed up for interview in this category. She graduated and travelled to work in the Arabian Gulf. Before that, Sandra passed the course again in the spring 2005 semester with a C^{+}.

Julie (pseudonym), the other student, changed her major immediately after failing the course in the spring 2004 semester to business. Julie dropped out of MSU a couple of semesters later. Her sister answered the phone call and said that Julie had got married and delivered a baby, but she would hopefully be back to complete her degree in the fall 2007 semester. The researcher conducted the interviews in the spring 2007 semester. Julie was the only female business computing student who failed the course the first time the course was taken. Had she participated in this study, the distribution of participants by sex in the sample would have matched perfectly well with that of the business computing population.

At the time of the interviews, six out of seven female students present on campus participated in the study. It was unfortunate that a female could not be recruited who had failed the course.

Sample compared to larger population by age

Table 4.3, p.102**,** compares the number of participants to the number of students enrolled in the business computing programme, the computer science department, and the main campus by age, from the fall 2001 to the spring 2007 semesters. Data in this table show that the larger the population, the wider the range of ages.

Still, numbers were skewed towards younger ages in all populations (see Table 4.3, p.102). In addition, the business computing average age was almost the same as that of the computer science department and the University's main campus populations (see Table 4.3, p.102).

All participants were young, with ages ranging from 19 to 26 years and an average age of 21.7 years (see Table 4.3, p.102). The latter falls lower than the average age of business computing students by 2.6 years. One explanation to this is that the business computing programme has been attracting in its recent years students with younger ages compared to its earlier stages. Participants aged 21 formed the biggest group, while participants aged 26 formed the lowest group. Of all participants, 68.9% were aged between 19 and 22 years (see Table 4.3, p.102).

Sample compared to larger population by nationality

Of the 51 student nationalities at MSU, the sample included just 4 (see Table 4.4, p.103). Also, the majority of the participants were Lebanese as was the case with the business computing programme, the computer science department, and the University.

The data in Table 4.4, p.103, show that dozens of Americans, Canadians, Australians, Palestinians, French, Syrians, British and others choose to earn their degrees from the University under focus. The 'other' category includes one student from each of the following countries: Albania, Andorra, Antigua & Barbuda, Argentina, Costa Rica, Hungary, Netherlands, Norway, Qatar, Romania, Senegal, Trinidad, and Yemen.

Table 4.3: Sample vs. Larger Populations by Age - Fall 2001 to Spring 2007

Age	Sample	BC Prog.	CS Dept.	University
17				2
18		1	2	68
19	6	6	29	604
20	8	28	62	799
21	10	20	53	782
22	7	34	87	842
23	4	38	92	819
24	4	53	117	842
25	4	42	115	829
26	2	44	103	774
27		41	111	743
28		17	45	530
29		10	43	412
30		1	14	221
31			14	120
32			17	76
33			7	49
34		4	1	36
35			2	24
36		1	2	22
37			3	19
38			1	17
39			1	11
40				10
41				10
42				10
43			1	10
44				5
45			1	7
46				6
47				5
48				7
49				1
50				3
51				2
52				1
53				2
54				1
56				1
57				1
58				1
Total	**45**	**340**	**923**	**8724**
Average	**21.7**	**24.3**	**24.8**	**24.4**

Prog. = Programme; Dept. = Department

Table 4.4: Sample vs. Larger Populations by Nationality - Fall 2001 to Spring 2007

Nationality / Students	Sample		BC Prog.		CS Dept.		University	
	Count	%	Count	%	Count	%	count	%
LEBANESE	42	93.33	329	96.76	895	96.97	8206	94.06
AMERICAN					1	0.11	98	1.12
CANADIAN			2	0.59	3	0.33	80	0.92
AUSTRALIAN	1	2.22	1	0.29	3	0.33	40	0.46
PALESTINIAN			3	0.88	7	0.76	38	0.44
FRENCH					2	0.22	35	0.40
SYRIAN	1	2.22	1	0.29	2	0.22	28	0.32
BRITISH			1	0.29	1	0.11	26	0.30
JORDANIAN							15	0.17
GHANAIAN					1	0.11	13	0.15
SAUDI ARABIAN							13	0.15
EGYPTIAN			1	0.29	1	0.11	11	0.13
BRAZILIAN	1	2.22	1	0.29	1	0.11	9	0.10
GREEK							9	0.10
VENEZUELAN					1	0.11	9	0.10
NIGERIAN			1	0.29	1	0.11	6	0.07
IRAQI					2	0.22	6	0.07
POLISH							6	0.07
CYPRIOT							5	0.06
SIERRA LEONEAN							5	0.06
COLOMBIAN							4	0.05
DANISH							4	0.05
GAMBIAN							4	0.05
MEXICAN							4	0.05
SPANISH							4	0.05
SWEDE							4	0.05
AFRICAN							3	0.03
BELIZEAN							3	0.03
ITALIAN					1	0.11	3	0.03
RUSSIAN							3	0.03
SWISS							3	0.03
BELGIAN							2	0.02
BULGARIAN							2	0.02
CZECHOSLOVAKIAN					1	0.11	2	0.02
GERMAN							2	0.02
SOUTH AFRICAN							2	0.02
SUDANESE							2	0.02
TURK							2	0.02
Other							13	0.15
Total	**45**	**100.0**	**340**	**100.0**	**923**	**100.0**	**8724**	**100.0**

Prog. = Programme; Dept. = Department

Academic levels of participants

By their academic levels, participants were sophomores, juniors, seniors, and graduates. Table 4.5 below shows that the largest and second largest clusters of participants were formed from junior and senior students respectively. Together, the two academic levels formed 71.1% of all participants. The main reason for this is that business computing students take CP1 in the second semester of the sophomore year if following the suggested curriculum. The high percentage indicates that many students completed the course as suggested in addition to accumulating the required number of credits by the spring 2007 semester, which promoted them to either the junior or senior level. Since interviews were conducted during the spring 2007 semester, plausibly sophomore participants completed CP1 either in the spring 2006 semester or the fall 2006 semester. These students were still sophomore, possibly because of either joining the programme with remedial courses or failing some courses. Their completion of the 61 credits which would promote them to the junior level was hindered.

Table 4.5: Distribution of Participants by Academic Level

Academic Level	Frequency in Sample	Percent of Sample
Sophomore	9	20.0%
Junior	19	42.2%
Senior	13	28.9%
Graduate	4	8.9%
Total	**45**	**100.0%**

For the reasons mentioned above, the sample included more participants from the junior and senior levels. Nevertheless, having the biggest cluster of participants from the junior year was an advantage because those students' experiences were closer in time to the completion of CP1 than those of senior students or graduates.

So far, the participants' profile was compared to that of the populations of the business computing programme, the computer science department, and the University as a whole with respect to sex, age, nationalities, and academic level. Next follows a brief description of how the sample was chosen based on five strata of achievement outcomes.

The participants' intellectual ability

The sample was created based on five student achievement level strata (see Table 4.6 below) through the random recruitment of business computing students who took the computer programming course. For a description of the course followed by students investigated in this study see p.15. The reasons for the creation of a sample of five strata are stated on p.86. The same number of students, nine participants, was recruited from each stratum.

Table 4.6: Distribution of Participants by Achievement Level

Achievement Level	Grades	Frequency in Sample	Percent of Sample
High	A^+, A, A^-	9	20.0%
Good	B^+, B, B^-	9	20.0%
Satisfactory	C^+, C	9	20.0%
Passing	C^-, D^+, D	9	20.0%
Low	F, UW	9	20.0%
Total		**45**	**100.0%**

The status of participants with respect to the business computing programme

It was very important to shed light on the status of each participant in relation to the sequence of computer programming courses. Locating participants with respect to CP1 uncovered the presence of 7 distinct groups and enriched the profile of participants. The course CP1 is a prerequisite for 'Computer Programming 2' (CP2). The latter is the second course in the computer programming sequence. Only students who pass CP1 can take CP2. Students who fail CP1 must repeat it.

The seven groups were as follows: participants who took CP1 and CP2, and graduated from the business computing programme (Graduated); participants who took CP1 and CP2, and were still enrolled in the programme at the interview time (CP2 Completed); participants who took CP1 and were enrolled in CP2 at the interview time (CP2 in Progress); participants who took and repeated CP1, and did not take CP2 before the interview time (Repeated CP1); participants who took CP1 and repeated it at the interview time (Repeated CP1 in Progress); participants who took CP1, but did not take CP2 before the interview time (CP1 Completed); and participants who took CP1, did not take CP2, and shifted to another major before the interview time (Changed Academic Programme). The words in parenthesis are used as column labels in Table 4.7 below to represent each group.

The data in Table 4.7 below reveal that at the time of the interview, the spring 2007 semester, three participants were repeating the CP1 course (see column heading 'Repeated CP1 in Progress'). Of these three students, one failed the course for the second time, while the other two participants passed the course. During that time too, 14 students were enrolled in CP2 (see column heading 'CP2 in Progress'), while twenty-four students had already completed 'Computer Programming 2' (see column heading 'CP2 Completed'). Of the 45 participants, three had changed their major and participant 11 was on the verge of changing

his major. Extract 4.1 below shows the situation participant 11 was in [Q = interviewer's question, R = participant's response]:

Extract 4.1 [Participant 11]

Q: Did you feel that the cause was under your control?

R: No, because I have spent long time at the University and I need a way to get out / I cannot lose more time at the University, so I cannot repeat the course a third time, add to it that I don't like the subject and that I will not succeed in it / why should I continue in this area

Q: It seems that this situation did not motivate you to take another programming course?

R: I believe that programming I is the basis of all programming courses / if I could not start out in programming I, then I will not be able to start out in any other programming course / the University is a small percentage of what you will see in real life, at work / I realized that with the ample time I had to study for the course and I did not benefit to study this course, the contains all the fundamentals of programming, then there is no way that I continue in programming

Table 4.7, p.108, is useful in analysing differences in causal attribution among various groups along a timeline where the point of reference is the status of participants with respect to CP1 in the business computing programme. Participants who left the programme fell into two small groups, those who graduated and those who changed their academic programme. The two groups went in opposite directions and gave two different sets of causal attributions. The groups of participants who remained in the programme did not seem to have major differences in causal attributions.

Table 4.7: Causal Attributions from Enrolment Perspective

Causal attribution / Student status	Graduated	CP2 Completed	CP2 in Progress	Repeated CP1	Repeated CP1 in Progress	CP1 Completed	Changed Academic Programme	Total
Lack of study	2	7	3	1		1		**14**
Appropriate learning strategy	1	7	5					**13**
Lack of practice	1	3	4		2			**10**
Inappropriate learning strategy		1	2		1		1	**5**
Subject difficulty		1					1	**2**
Lack of effort							1	**1**
Total	**4**	**19**	**14**	**1**	**3**	**1**	**3**	**45**

The Process of Analyzing the Research Data

The analysis of data started with 45 text files which were the electronic copies of the interview transcripts. To read these text files with HyperResearch, they were all copied into one subfolder of the folder that contained the thesis. All text files were changed to read-only status to protect them from being edited. These files were in plain text format with a .txt extension and a name that identifies the interviewee. When HyperResearch was launched, it started with a blank study that was named using the phrase Attribution Theory and the creation date. This study created a Case Card that was named using the first name in the list of interviewees. Then, the text file that contained what this interviewee said was opened. At this stage, the text file became the source file of a Case Card. Then, it was ready for coding. This is discussed in the next paragraph. Once the process of coding a source file is completed, the interviewee's Case Card was added to the study and linked to another source file with the Open Source command in HyperResearch. Since there were 45 participants in this study, 45 Case Cards were added to this HyperResearch study.

The coding process started by opening the first source file in the study. A Source File Window in HyperResearch displayed the source file's content as a single vertically scrollable page. The source file's content displayed each question posed during the interview followed by its answer as it occurred during interview. Thus, source files were already divided into manageable chunks of text which simplified the coding process to a great extent. At this stage, the Code List Editor of HyperReseach was empty. This made sense because the investigation at hand was following an exploratory approach to data analysis.

Each source file was read carefully from beginning to end. The first question 'Did you take the course CSC 216?' was an icebreaker. All participants answered this question by 'Yes'. There was no need to code this answer since participants were selected on the basis of having taken CSC 216. The latter is the number of

the ‘Computer Programming I’ course (CP1). The second question was ‘What was the outcome of the course?’ This question relates to the event which triggered the making of causal attributions according to attribution theory. Answers to this question were coded starting with ‘CP1 grade was’. The first participant’s answer to this question was F (Fail). Consequently, the researcher created a Grade code ‘F’ and applied it to the interviewee’s answer. While ‘F’ is used in the thesis, line 83 in Appendix E shows the code added to the Code List Editor of HyperResearch. In this way, the coding of the first source file continued by noting the answer that the interviewee gave to each question asked. At the end of this first coding and analysis session, 29 codes were applied to the text of the source file.

After coding the first interviewee’s source file, a new Case Card was created and linked to a source file related to the second participant. The coding process was repeated. Some text in the new source file such as the one about the academic level being senior appeared in the previous source file. Thus, there was no need to add a new code to the Code List Editor. The code ‘Academic level is senior’ from the Code List Editor was applied to the appropriate text in the new source file. Some new code was added for the first time such as ‘CP1 grade was B’ and ‘Cause 1 was unstable’. Furthermore, this interviewee repeated some of what he said at several occasions during the interview. For this reason, some code was applied twice such as, in addition to others, ‘Achievement striving helped’, ‘Causal antecedent - Familiarity with programming’, and ‘Cause 1 global’. As a result, the second Case Card included 32 codes which exceeded the number of codes applied to the first Case Card (29 codes). This is one reason why the number of codes differed amongst Case Cards. Another reason was that in some cases it was not appropriate to ask a question about a certain feeling such as gratitude to a low achiever when already some discontent was shown with previous questions about pity and shame.

Coding all 45 source files required populating the Code List Editor with 168 codes (see Appendix E). Some of the codes were renamed to become more meaningful. Other code included short forms to remain visible and readable in the Code List Editor. The full text of what these short forms stood for was added to the Code Description window. Some of the extracts below will illustrate this point. These have been chosen to show how some of the key themes and sub-themes were arrived at and how the codes were assigned to them in the process of analysing the interview data. At the end of the chapter, two complete Case Cards of the 45 that were created during the analysis phase will be fully illustrated as case studies using extracts from their source files followed by textual interpretations.

Key-theme: causal attributions – question asked by the researcher

The question that was posed to obtain the causal attribution made by each participant about the CP1 course grade is: 'What do you think have caused the course outcome?' Looking at what each of the participants said led the researcher to create 11 Causal Attribution codes which reflected 11 emergent themes in what students had said to him during their interviews. Of the 11 causal attributions, the constructing of codes for three key themes are illustrated 'lack of study', 'lack of practice' and 'lack of effort'.

Key-theme: causal attributions - lack of study

Studying for a computer programming course requires several activities including reading the assigned course textbook and the recommended resource textbooks; using the on-line library for knowledge base and for snippets of code; learning the syntax and logic of computer concepts; analysing ready made applications; evaluating the output of individual lines of code as well as blocks of code; trying out ready made applications; making amendments to ready made applications; building applications based on the learner's creativity which shows intrinsic interest in computer programming; doing assignments that include building applications and engaging in discussions using the BlackBoard e-learning system;

and attending classes and engaging actively in class discussions. The extract below is what Participant 2 had to say about changing her learning strategy during the course. She received an A on this course.

[Participant 2]

R: During the first exam I worked very hard and repeated everything at home, but I was learning by heart, I was not practicing / learning by heart does not help because this course is about logic / the second exam I practiced and I felt the difference / my grade went up from 18 over 25 in the first exam to 24 over 25 in the second exam / the difference is noticeable

The extract above shows that 'repeating everything at home' helped her obtain 18 over 25 as she said. Every class session includes almost all activities mentioned above the extract. However, it seems that Participant 2 skipped the practice part before exam 1. After including practice in her learning strategy her grade improved drastically. This shows that practice is only one aspect of learning computer programming. However, all what some students do is practice the code they learn in class which is necessary but not sufficient especially if what they mean by practice is keying in an application in the development tool and run it to see the output.

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'lack of study' was applied. While 'lack of study' is used in the thesis, line 34 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch.

[Participant 1]

R: lack of attendance and lack of preparation for the final, I did not send assignments, and I did not follow the course

[Participant 24]

R: I did not study enough. I did not solve the assignments as I should have done. Sometimes, I took chunks of the assignments from other students.

[Participant 27]

R: At the beginning I was not studying enough

[Participant 35]

R: The first time, the main reason was that I did not study the material

[Participant 43]

R: I could have received a better grade, but I did not study well the last period. I could not study. I did not have much time to study for the course.

All the extracts above either include the word studying, some aspects of studying as illustrated in the first paragraph in this section, or both.

Key-theme: causal attributions - lack of practice

Practice in learning computer programming requires the use of a computer and the development tool, Visual Basic in this case study, to try out or create applications that meet the lesson's objectives. Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'lack of practice' was applied. While 'lack of practice' is used in the thesis, line 33 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch.

[Participant 3]

R: The code is known / you just need to become familiar with / it is not difficult / if one can understand a little programming one can grasp it / it does not have to be memorized

[Participant 4]

R: If one has practiced it, then he can finish it in a timely manner. But, if one has not practiced it, that is he did another task, then he cannot do it given the time limitation

[Participant 7]

R: I should have practiced more

[Participant 14]

R: I should have practiced hard at home, on campus, use the computer in class to stay aware of what is going on / there was a wide difference between the students and myself / they were able to practice / when they worked on the computer they did well, but I did not / I could not remember simple things like the concatenation sign or where it is on the keyboard / I was slow with respect to other students

[Participant 20]

R: I did not practice / I did not practice enough

Key-theme: causal attributions - lack of effort

Below is the sole extract, that illustrates the text, said by a participant in response to the question above, on which the Causal Attribution code 'lack of effort' was applied. While 'lack of effort' is used in the thesis, line 32 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch.

[Participant 16]

R: I was not preparing adequately / if it required two hours of preparation at home per day, I used to spend just two hours per week

Q: What can we call this?

R: Lack of effort.

Compared to Participant 2, Participant 16 did not seem to have studied at all for the course. For that reason he labelled his causal attribution 'lack of effort'.

Research Findings Framed By Research Questions

What follows in this section is a presentation of what participants said in response to each one of the six research questions using tables and interview extracts. The interview transcripts contained numerous and complex data that were reduced into 43 tables and 5 charts from this point onwards. A total of 168 codes were used in HyperResearch to label segments of interview transcripts said by participants in response to each research question. The code list is presented in Appendix E. Each code rephrases in a few words a meaning conveyed in long statements. Line numbers were added to allow referencing in text the codes as the need arises. Blank lines were inserted to combine related codes visually.

In tables, codes are reduced to simple categories such as 'supportive' versus 'obstructive' or 'internal' versus 'external'. While the former categorization arose during analysis, the latter was taken from attribution theory. A row reflects what an individual participant said in response to a research question and related probes, in a reduced format. In addition, a row as a whole maintains the structure of what was said whereas the sequence of cells reflects the actual order in which responses were revealed. A blank cell indicates the non-occurrence of a phenomenon.

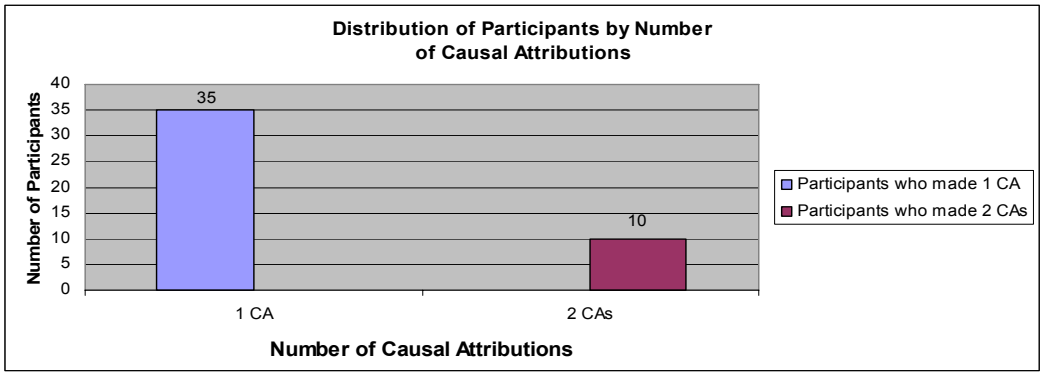
A total of 22 interview extracts are used to exemplify emerging and important themes. Additional interesting extracts could have been presented, but the maximum word count for the thesis was not set to be exceeded. In addition, the terms 'perceived' or 'ascribed' refer to what the students actually said in their interviews. These terms are used in line with the attribution theory terminology.

Research Question # 1

What are the causal attributions (CAs) of achievement outcomes in computer programming made by business computing students?

The purpose of this research question was to identify the causal attributions given by participants in relation to their achievement outcomes in CP1. The open-answer format of the research question produced two types of responses (see Chart 4.3 below). While 35 participants made one causal attribution, 10 participants made two causal attributions (see Table 4.10, p.120). The codes that represent the causal attributions given by students are in lines 30-35 and 44-48 in Appendix E. There was no single participant who gave no cause for the course outcome or ascribed it to more than two causes.

Chart 4.3: Distribution of Participants by Number of Causal Attributions



The findings presented in Table 4.8, p.117, and Table 4.9, p.119, show that the causal attributions of achievement outcomes in CP1 made by business computing students were 11 in all. Of the 11 causal attributions, 6 were classified as key causes such as 'lack of study' (see Table 4.8, p.117) because achievement outcomes were either ascribed to them as the only causes or to them in association with other causes (see Table 4.10, p.120). 'Lack of study' was the leading causal attribution and 'Appropriate learning strategy' came in the second place. The former causal attribution was obstructive and the latter was supportive.

An interesting finding was that the least cited cause was 'lack of effort' which is discussed in the analysis chapter**,** pp.190-1.

Table 4.8: Causal Attributions Made by Participants – Key Causes

Key Causal Attributions			
	Causal attribution	**Number of Participants**	**Percent**
1	Lack of study	14	31.1%
2	Appropriate learning strategy	13	28.9%
3	Lack of practice	10	22.2%
4	Inappropriate learning strategy	5	11.2%
5	Subject difficulty	2	4.4%
6	Lack of effort	1	2.2%
	Total	**45**	**100.0%**

Extract 4.2 below shows how participant 27 attributed his causal attribution to 'lack of study' and how he mentioned increasing effort as a way out of the problem [Q = interviewer's question, R = participant's response]. 'Lack of study' was used everywhere in the interview.

Extract 4.2 [Participant 27]

R: I am responsible for the lack of study, I was young and frivolous / I felt that I made a mistake / I should have made more effort.

Putting in effort in terms of working hard is necessary, but not sufficient. The two extracts below illustrate this point.

Extract 4.3 [Participant 9]

R: The amount of effort was adequate, but my learning strategy was not good

Extract 4.4 [Participant 13]

R: During the first exam I worked very hard and repeated everything at home, but I was learning by heart, I was not practicing / learning by heart does not help because this course is about logic / the second exam I practised and I felt the difference / my grade went up from 18 over 25 in the first exam to 24 over 25 in the second exam.

'Lack of study', 'lack of practice', and 'lack of effort' share in common the admission by participants of the need for study, practice, and effort in the learning process, and the confession of not employing them sufficiently. Participants, who cited 'appropriate learning strategy' and 'inappropriate learning strategy', displayed an awareness of the existence of a learning strategy appropriate to computer programming and of the fact that its implementation maximizes achievement.

Below are some interview extracts that illustrate how participants emphasised the importance of practice in learning computer programming.

Extract 4.5 [Participant 6]

R: … the other courses required learning by heart and in memorizing I have a photo memory / when I read about an idea before time I can directly recall it / however, in programming it is not an issue of memorizing / it is logic, understanding, and learning the syntax / I have logic, but logic in programming requires practice / logic alone does not suffice

Extract 4.6 [Participant 14]

R: … the course is not based on studying such as just reading a textbook / it includes work / it includes practice / if even you read all the chapter and the example / unless you try them out you cannot memorize them and you cannot tell what is going on / this is it

Extract 4.7 [Participant 31]

R: I liked this programming course and I used to work such as coding on the computer. I used to develop programs. Other courses were not the same. They were based on rote learning, memorizing and other ways.

Extract 4.8 [Participant 39]

R: it is essential to practice, to get used to coding because you might know all the exam, but you will not have time to complete it in hour / that is why if you have practised you may complete the whole exam / maybe you know them all, but the time or the speed count / with practice you get faster in programming

Of the 11 causal attributions, 5 were classified as associate causes such as 'appropriate teaching method' (see Table 4.9 below) because achievement outcomes were ascribed to them in association with key causes. No participant cited an associate cause as sole cause (see Table 4.10, p.120). For instance, no participant ascribed success only to 'appropriate teaching method'. 'Appropriate teaching method' was the leading associate causal attribution. The latter and 'appropriate learning strategy' formed a duet in 6 different instances.

Table 4.9: Causal Attributions Made by Participants – Associate Causes

Associate Causal Attributions		
	Causal attribution	**Number of Participants**
1	Appropriate teaching method	6
2	Exam anxiety	1
3	Cheating	1
4	Lack of time	1
5	Unfair treatment	1
	Total	**10**

Table 4.10: Linkages between Key Causes and Associate Causes

Type of Causal Attribution		**Frequency in Sample**		
Key Cause	**Associate Cause**	**Key Cause**	**Key Cause & Associate Cause**	**Subtotal**
Lack of study		13		**14**
Lack of study	Unfair treatment		1	
Appropriate learning strategy		6		**13**
Appropriate learning strategy	Appropriate teaching method		6	
Appropriate learning strategy	Exam anxiety		1	
Lack of practice		8		**10**
Lack of practice	Cheating		1	
Lack of practice	Lack of time		1	
Inappropriate learning strategy		5		**5**
Subject difficulty		2		**2**
Lack of effort		1		**1**
Total number of participants by number of Causal Attributions		**35**	**10**	**45**

Key causal attributions and student achievement levels

Table 4.11 below illustrates the distribution of key causal attributions by student achievement levels. Here, the findings show that participants who ascribed their achievement outcomes to 'lack of study' belonged to all achievement levels except high achievement (Level A).

Participants who ascribed their achievement outcomes to 'appropriate learning strategy' belonged to three achievement levels high, good, and satisfactory. The higher the achievement level, the more it encompassed these participants. Since no one from the D and F levels claimed to have followed an 'appropriate learning strategy', the information revealed by those participants gained more credibility.

Also, the findings in Table 4.11 below show that participants who ascribed their achievement outcomes to 'lack of practice' and 'inappropriate learning strategy' belonged to all achievement levels except high achievement. The number of participants who cited either 'lack of study', 'lack of practice', or 'inappropriate learning strategy' was nearly evenly divided amongst non high achievers. A larger sample might have shown larger variation.

Table 4.11: Distribution of Key Causal Attributions by Achievement Level

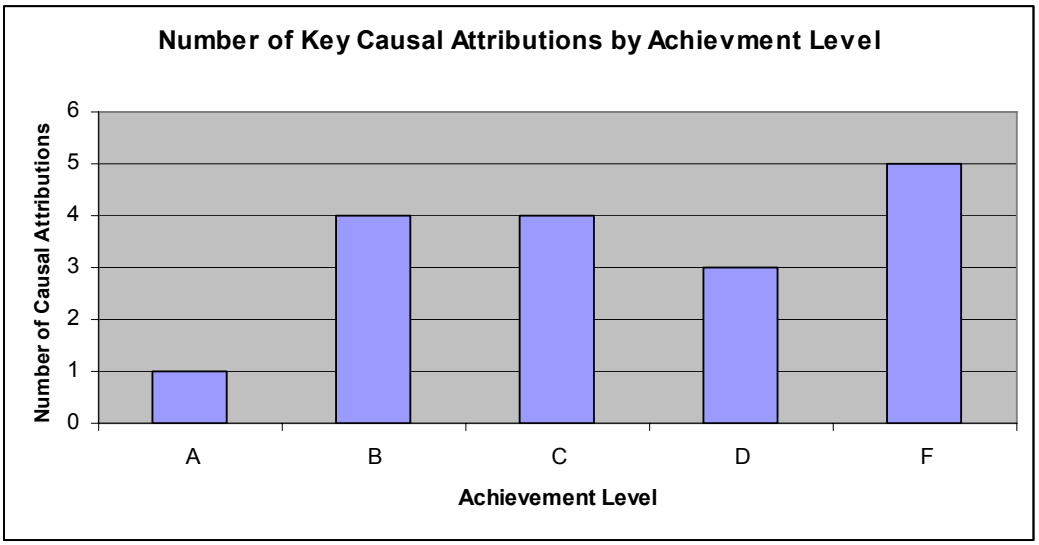
Key Cause / Achievement Level	**A**	**B**	**C**	**D**	**F**	**Total by Key Cause**
Lack of study		3	4	4	3	14
Appropriate learning strategy	9	3	1			13
Lack of practice		2	3	3	2	10
Inappropriate learning strategy		1	1	2	1	5
Subject difficulty					2	2
Lack of effort					1	1
Total by Achievement Level	**9**	**9**	**9**	**9**	**9**	**45**

The group of high achievers was distinguished by three factors. First, all nine participants cited one key cause, 'appropriate learning strategy' (see Table 4.11, p.121). Second, they cited the least number of key causal attributions (see Chart 4.4 below). Third, they did not cite any obstructive key cause.

Both groups of good and satisfactory achievers were distinguished by citing the same 4 causal attributions (see Table 4.11, p.121). Those 4 causal attributions included both supportive and obstructive key causal attributions. The group of passing achievers was distinguished by citing neither the supportive key causal attribution 'appropriate learning strategy' nor causal attributions detrimental to their achievement striving, 'subject difficulty' and 'lack of effort'.

The group of low achievers was distinguished by three factors. First, participants who ascribed their achievement outcomes to 'subject difficulty' or 'lack of effort' belonged to this group (see Table 4.11, p.121). Second, low achievers cited the highest number of causal attribution amongst all achievement level groups (see Chart 4.4 below). Third, they cited all obstructive key causal attributions, but not the supportive key cause 'appropriate learning strategy'.

Chart 4.4: The Number of Key Causal Attributions by Achievement Level



Associate causal attributions and student achievement levels

Table 4.12 below illustrates the distribution of associate causal attributions by student achievement level. Ten (22.2%) out of 45 participants made two causal attributions. The findings show that the highest number of participants who made a second causal attribution was from the A group. They were six and they all cited the same associate causal attribution 'appropriate teaching method'. They expressed their appreciation for the 'appropriate teaching method' that enabled them to obtain an excellent grade. Participants from the other achievement levels did not cite this cause. The four remaining associate causes spread over the good, satisfactory, and passing groups. Despite their undesirable effect on the learning process, their emergence in this study was reassuring because they were infrequent and it would be surprising not to have any of these negative events happening in a cohort of 45 students.

Table 4.12: Distribution of Associate Causal Attributions by Achievement Level

Associate Cause / Achievement Level	**A**	**B**	**C**	**D**	**F**	**Total**
Appropriate teaching method	6					6
Exam anxiety			1			1
Cheating				1		1
Lack of time		1				1
Unfair treatment				1		1
Total	**6**	**1**	**1**	**2**	**0**	**10**

Supportive versus obstructive associate causes

Table 4.13, p.125, depicts the effect of every causal attribution on the motivation of participants who cited two causes. Associate causes were characterised either as supportive or obstructive to achievement. Four associate causes were obstructive to achievement: 'exam anxiety', 'cheating', 'lack of time', and 'unfair treatment'. Except for the last row, Table 4.13 shows that obstructive associate causal attributions worked either with an obstructive key cause or against a

supportive key cause to hinder student achievement. Participant 27, in the second row, believed that he received D instead of D^+ or C^- because his teacher treated him unfairly. Participant 18, in the third row, believed that he received a D instead of C^+ or B^- because a classmate copied from him. No such information was given by the third participant. The second category included only one instance where the participant gave one supportive and one obstructive cause. It was participant 42, in the fifth row, who suffered from 'exam anxiety' which worked against the effectiveness of the supportive key cause 'appropriate learning strategy' yielding a satisfactory outcome. Participant 42 believed that he received a C^+ because of 'exam anxiety' instead of at least a B. The third category included six instances where both causes were supportive to reach a high achievement outcome. Those causes were 'appropriate learning strategy' and 'appropriate teaching method'. They were cited only by high achievers (see the last row in Table 4.13, p.125).

Causal attributions and age

Table 4.14, p.126, illustrates the distribution of causal attributions by age. The data here show that not only 'lack of study' was the leading causal attribution, but it was the single causal attribution that was shared by participants from all ages. Another interesting result was that 'appropriate learning strategy' was more endorsed by the lower half of the age range, ages from 19 to 22. The ages of participants who ascribed their achievement outcomes to 'lack of practice', 'inappropriate learning strategy', 'subject difficulty' and 'lack of effort' did not seem to follow a particular pattern plausibly because of the small sample size.

Table 4.13: The Effect of Every Causal Attribution on the Motivation of Participants Who Cited Two Causes for Their Achievement Outcome

Number of Participants	Participant	Category	Causal Attribution	Effect	Course Outcome
1	27	Both obstructive	Lack of study	obstructive	D
			Unfair treatment	obstructive	
1	18		Lack of practice	obstructive	D
			Cheating	obstructive	
1	4		Lack of practice	obstructive	B
			Lack of time	obstructive	
1	42	Different	Appropriate learning strategy	supportive	C
			Exam anxiety	obstructive	
6	29, 30, 31 32, 34, 36	Both supportive	Appropriate learning strategy	supportive	A
			Appropriate teaching method	supportive	

Table 4.14: Distribution of Causal Attributions by Age

Causal Attributions		Age								Number of Participants
Key Cause	**Associate Cause**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	
Lack of Studying		2	1	2	4	1	2	1		13
Lack of Studying	Unfair treatment								1	1
Appropriate Learning Strategy		1		2	1			2		6
Appropriate Learning Strategy	Appropriate Teaching Method		4	2						6
Appropriate Learning Strategy	Exam anxiety	1								1
Lack of Practice		2		2	1	2			1	8
Lack of Practice	Cheating			1						1
Lack of Practice	Lack of time							1		1
Inappropriate Learning Strategy			3	1	1					5
Subject difficulty						1	1			2
Lack of Effort							1			1
Total number of participants by age		**6**	**8**	**10**	**7**	**4**	**4**	**4**	**2**	**45**

Causal attributions and sex

Table 4.15 below shows that females did not cite any causal attributions different from males. 'Lack of practice', 'subject difficulty', and 'lack of effort' were not cited by female participants, most likely due to the small size of the females sample.

Table 4.15: Distribution of Causal Attributions by Sex

	Causal attribution	Females	Males	Total
1	Lack of study	2	12	14
2	Appropriate learning strategy	2	11	13
3	Lack of practice	0	10	10
4	Inappropriate learning strategy	2	3	5
5	Subject difficulty	0	2	2
6	Lack of effort	0	1	1
	Total	**6**	**39**	**45**

Causal attributions and academic level

The data in Table 4.16, p.128, show that participants who ascribed their achievement outcomes to 'lack of study', 'appropriate learning strategy', and 'lack of practice' were from all academic levels. Participants who ascribed their achievement outcomes to 'inappropriate learning strategy' or 'subject difficulty' were either junior of senior. The participant who ascribed achievement outcomes to 'lack of effort' was junior. Junior participants formed the largest group and their causal attributions covered all six key causes. Senior participants formed the second largest group and their causal attributions covered all key causes except 'lack of effort'.

Table 4.16: Distribution of Causes by Academic Level

Causal attribution	Sophomore	Junior	Senior	Graduate	Number of Participants
Lack of study	1	4	7	2	14
Appropriate learning strategy	3	7	2	1	13
Lack of practice	3	4	2	1	10
Inappropriate learning strategy	2	2	1		5
Subject difficulty		1	1		2
Lack of effort		1			1
Total	**9**	**19**	**13**	**4**	**45**

Research Question # 2

How did business computing students come to identify the reasons that caused their achievement?

Instigation of attributional processes

According to the theory (pp.27-8), students who receive unexpected outcomes make causal attributions. The findings here show that participants who expected their achievement outcomes were far more than those who obtained achievement outcomes that they did not expect (see Table 4.17 below). The explication of this is discussed in the Analysis and Discussion chapter (pp.177-9).

Table 4.17: Expected vs. Unexpected Achievement Outcomes and Their Distribution by Student Achievement Level

Level	**A**	**B**	**C**	**D**	**F**	**Total**	**Percent**
Expected	7	8	5	6	7	33	73.3%
Not expected	2	1	4	3	2	12	26.7%
Total	**9**	**9**	**9**	**9**	**9**	**45**	**100%**

Students who expected to fail gave the following reasons 'lack of study', 'subject difficulty', 'lack of effort', and 'lack of practice'. Although participant 5 did not expect his course outcome, his causal search remained unanswered until much later (see Extract 4.9 below).

Extract 4.9 [Participant 5]

R: I was not aware of the cause until later / I only knew that I was the cause of F when I started studying / the first time I took an F, I questioned why I took F, I do not deserve an F, this is not acceptable, I did not know why even though my grades did not make me eligible to pass

Sources of causal attributions

Participants made their causal attributions guided by several sources called causal antecedents in attribution theory (see p.40). Codes used to represent the causal antecedents given by students are shown in lines 15-29 in Appendix E. Table 4.18 below depicts the causal antecedents cited by the participants in this study.

Table 4.18: Causal Antecedents of Causal Attributions and Their Distribution by Student Achievement Level

Causal Antecedent / Level	A	B	C	D	F	Total	Percent
Carelessness	1	3	3	4	2	13	29.9%
Work	1	3	4	1	4	13	29.9%
Unfamiliarity with programming	2	2		4	1	9	20.0%
Performance of others			2	1	3	6	13.3%
Liking programming	3	1				4	8.9%
Laziness		1	1		1	3	6.7%
Familiarity with programming	1	1			1	3	6.7%
Sickness		1		2		3	6.7%
Lack of guidance				1	1	2	4.4%
Good teaching	1	1				2	4.4%
Psychological State			1			1	2.2%
Academic Probation					1	1	2.2%
Democracy	1					1	2.2%
Indifferent to programming					1	1	2.2%

In Extracts 4.10-4.11 below, participant 8 cited ‘carelessness’, and participant 21 cited ‘performance of others’ as causal antecedents.

Extract 4.10 [Participant 8]

R: … / I used to miss classes / when I enter the class I used to find out that all the students know the material / it was my mistake / I am the source of those mistakes

Extract 4.11 [Participant 21]

R: … / I noticed that all students understood the material / I was the only one who did not understand it, therefore I was the source of the problem, the cause was not external to me / the problem was neither the teacher nor the course

Some participants mentioned one, two, three, or even four causal antecedents. The leading causal antecedents were ‘carelessness’ and ‘work’ which have important implications on the learning process that will be discussed on p.188. ‘Unfamiliarity with programming’ came in the second place.

Research Question # 3

What are the underlying properties of causal attributions of business computing students’ achievement outcomes in computer programming with regard to causal dimensions: locus of causality, stability and controllability?

Codes used to label segments of interview transcripts said by participants in response to this research question are shown in lines 36-43 and 49-56 in Appendix E. Tables were used to reflect in concise format information revealed by participants themselves during the interview. The term ‘causal property’ refers to the value a participant gives to place a causal attribution on one of its causal dimensions. For example, the words ‘stable’ and ‘unstable’ are two causal

properties used to place a causal attribution on the causal dimension 'locus of causality' (see p.37). While Tables 4.19-4.29 depict the causal properties grouped by causal attribution, Tables 4.30-4.34 depict causal properties grouped by student achievement level. There are eleven causal attributions and five student achievement levels. The terms *attributed*, *ascribed* and *perceived* reflect only the students' beliefs that they revealed explicitly during interviews. These terms are part of the attribution theory terminology. While the terms *attributed* and *ascribed* are used when a student gives a cause, the term *perceived* is used when the underlying properties of a cause are given.

The first column in Tables 4.19-4.34 displays the numbers of participants in the HyperResearch database. The intention is to simplify tracking any one participant in referencing and in analysis. For instance, participant 3 is not included in Table 4.19, p.136, because he did not give 'lack of study' as a cause for his course outcome. The last three columns contain the outcome of 'Computer Programming 1' (CP1), the achievement outcome resulting from the causal attribution, and the outcome of the repeated CP1 or of 'Computer Programming 2' (CP2). The columns labelled *Locus of Causality*, *Stability*, *Controllability*, and *Globality* display the properties of each causal attribution as perceived by each student. Locus of causality refers to whether the perceived cause is an internal or external factor to the student (see p.37). Stability refers to whether the perceived cause remains the same or changes over time (see p.37). Controllability refers to whether the perceived cause is subject to volitional alteration (see p.37).

Globality was not included in the third research question because Weiner's attribution model did not encompass it (Weiner 2000, p.3). However, the researcher noticed from the first interview that while some participants said that the cause of their computer programming course outcome was uncontrollable, others said that it was uncontrollable in all their courses that same semester. Consequently, a question about globality was added to the interview (see Appendix D). As a result, globality was added to Tables 4.19-4.34 as a fourth

dimension. The causal properties associated with the globality dimension are specific and global. The student information system was used to verify that what participants revealed was right following their consent (see Appendix C).

The interview extracts below show how participants 11 and 38 perceived their causal attributions as global, while participant 35 perceived it as specific [R = participant's response].

Extract 4.12 [Participant 11]

R: I went through a period where I was careless in many subjects, work, the country's political situation, I am the kind of person who cannot live under such pressure / I cannot live irrespective of what is going on around me / I cannot live in a country with such persistent pressure / you might tell me to forget what is happening and to concentrate on my work, to study, to sit in your room / one day there is war, another day there is no war / one day the University will close, another day the University will not close / sometimes there are strikes / even if I work and establish myself and succeed I might have to leave the country at one point / then I might not work with my business computing degree

Extract 4.13 [Participant 35]

R: I can not be precise, but my major in general is programming / CSC 216 was programming, it was my first programming course / regarding the others, their grades would not concern me / I was not interested in the other courses in as much as becoming sharp in programming

Extract 4.14 [Participant 38]

R: I did the same in all other courses / it was all jumbled in my head / I received my first probation on that semester

Causal properties of key causes

Table 4.19, p.136, contains data pertaining to the 14 participants who attributed their achievement outcomes to 'lack of study', the leading causal attribution. The findings here show that those 14 participants perceived 'lack of study' differently on all dimensions. 'Lack of study' tends to be more internal than external, more controllable than uncontrollable, and more global than specific. Half of the students said it was stable. Still, commonalities can be identified within subgroups such as the case of participants 1, 5, and 11. These were low achievers who perceived 'lack of study' as stable, uncontrollable, global, and this adversely affected their achievement. Consequently, they failed the course again. Although 'lack of study' caused the failure of these three participants, others who cited it passed the course. The majority of the students who perceived 'lack of study' as controllable improved their achievement outcome in CP2. Out of 4 students who perceived the cause as uncontrollable, 3 perceived it as stable and failed CP1 a second time. The fourth student who perceived it as unstable maintained his good achievement outcome.

Table 4.20, p.128, contains data pertaining to the 13 participants who attributed their achievement outcomes to 'appropriate learning strategy', the second most highly cited causal attribution. The findings here show that all 13 participants perceived this cause as internal, stable, and controllable. However, they perceived it differently on the globality dimension. That is, while some perceived 'appropriate learning strategy' as global, others perceived it as specific. 'Appropriate learning strategy' helped the achievement striving of all participants concerned. A student who knows how to study for CP1 does not necessarily know how to study for non-programming subjects. When asked if she perceived 'appropriate learning strategy' as specific to CP1, Lara (pseudonym) answered:

Extract 4.15 [Participant 13]

R: Definitely not, because I used to balance out the time amongst courses / studying at home helped me pass all the other courses

The following student perceived ‘appropriate learning strategy’ as specific.

Extract 4.16 [Participant 29]

R: No, every course had its own concept / one course fell in a domain that I dislike, one course fell in a domain that I like, it depends, it is motivation that brings about a grade

Table 4.21, p.139, contains data pertaining to the 10 participants who attributed their achievement outcomes to ‘lack of practice’. Those participants perceived ‘lack of practice’ differently on all dimensions. Nevertheless, ‘lack of practice’ tends to be perceived as internal. Only one student perceived it as external. The four students who perceived ‘lack of practice’ as stable and uncontrollable either failed CP2, obtained a lower grade, or failed CP1. One of two students who perceived ‘lack of practice’ as internal, unstable, controllable, and specific to CP1 failed CP2. Another student who perceived it as unstable, controllable, specific, but external improved his grade in CP2 because the cause was not present. All 10 participants said that ‘lack of practice’ did not hinder their achievement striving.

Table 4.19: Causal Properties of 'Lack of Studying' Cited by 14 Participants and Achievement Outcomes

	Combination of Causal Properties				**Lack of Studying**		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***Repeated CP1 Outcome, else CP2 Outcome***
1	external	stable	uncontrollable	global	F	hindered	CP1 F
2	internal	unstable	controllable	global	B	helped	CP2 A
5	internal	stable	uncontrollable	global	F	hindered	CP1 F
10	internal	unstable	controllable	global	B	helped	CP2 A
11	internal	stable	uncontrollable	global	F	hindered	CP1 F
12	internal	stable	controllable	specific	C	helped	CP2 D
22	internal	stable	controllable	global	D	helped	CP2 B
24	internal	unstable	controllable	global	C	helped	course not taken
25	external	unstable	controllable	global	C	helped	CP2 A
27	internal	unstable	controllable	global	D	helped	CP1 C
33	external	stable	controllable	global	D	helped	CP2 B
35	internal	unstable	controllable	specific	C	helped	CP2 B
37	external	stable	controllable	global	D	helped	CP2 B
43	internal	unstable	uncontrollable	global	B	helped	CP2 B

Table 4.20: Causal Properties of 'Appropriate Learning Strategy' Cited by 13 Participants and Achievement Outcomes

	Combination of Causal Properties				Appropriate Learning Strategy		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***CP2 Outcome***
6	internal	stable	controllable	global	B	helped	A
13	internal	stable	controllable	global	A	helped	A
15	internal	stable	controllable	global	B	helped	C
17	internal	stable	controllable	specific	A	helped	B
19	internal	stable	controllable	specific	B	helped	C
29	internal	stable	controllable	specific	A	helped	B
30	internal	stable	controllable	global	A	helped	A
31	internal	stable	controllable	specific	A	helped	A
32	internal	stable	controllable	specific	A	helped	B
34	internal	stable	controllable	specific	A	helped	C
36	internal	stable	controllable	global	A	helped	B
39	internal	stable	controllable	specific	A	helped	C
42	internal	stable	controllable	global	C	helped	UW

Table 4.22, p.140, contains data pertaining to the 5 participants who attributed their achievement outcomes to 'inappropriate learning strategy', the fourth highly cited causal attribution. The findings here show that the 5 participants perceived 'inappropriate learning strategy' differently on all dimensions except on the locus of causality dimension. On the locus of causality dimension, all of the 5 participants perceived 'inappropriate learning strategy' as internal. 'Inappropriate learning strategy' tends to be perceived more unstable than stable, controllable than uncontrollable, and global than specific. 'Inappropriate learning strategy' helped the achievement striving of some participants, while it adversely affected it for others. Participant 21 who perceived this cause as internal, stable, uncontrollable, and global changed his academic programme.

Table 4.23, p.140, contains data pertaining to 2 participants who attributed their achievement outcomes to 'subject difficulty', the second most trailing causal attribution. Both participants perceived 'subject difficulty' as internal, stable, controllable, and global. While 'subject difficulty' adversely affected the achievement striving of one participant, it did not for the other. The latter, participant 8, failed the course again and as a result changed his academic programme.

Table 4.24, p.141, contains data pertaining to one participant who attributed his achievement outcome to 'lack of effort', the most trailing causal attribution. 'Lack of effort' hindered the achievement striving of participant 16, who failed the course again and as a result changed his academic programme.

The results in this section indicate that students tend to perceive key causal attributions as internal. This finding along with other interesting patterns will be discussed in the analysis chapter.

Table 4.21: Causal Properties of 'Lack of Practice' Cited by 10 Participants and Achievement Outcomes

	Combination of Causal Properties				**Lack of Practice**		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***Repeated CP1 Outcome, else CP2 Outcome***
3	internal	stable	uncontrollable	global	C	helped	CP2 F
4	internal	unstable	controllable	specific	B	helped	CP2 A
7	internal	stable	uncontrollable	specific	C	helped	CP2 D
14	Internal/ External	stable	uncontrollable	global	F	helped	CP1 F
18	internal	stable	controllable	specific	D	helped	CP2 C
20	internal	unstable	uncontrollable	specific	F	helped	CP1 D
28	internal	unstable	controllable	specific	D	helped	CP2 F
40	internal	stable	uncontrollable	global	C	helped	CP2 F
41	external	unstable	uncontrollable	specific	D	helped	CP2 B
44	internal	stable	controllable	global	B	helped	CP2 D

Table 4.22: Causal Properties of 'Inappropriate Learning Strategy' Cited by 5 Participants and Achievement Outcomes

	Combination of Causal Properties				Inappropriate Learning Strategy		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***Repeated Course Outcome***
9	internal	unstable	controllable	specific	D	helped	CP2 B
21	internal	stable	uncontrollable	global	C	hindered	course not taken
26	internal	stable	controllable	global	D	helped	CP2 F
38	internal	unstable	controllable	global	F	hindered	CP1 D
45	internal	unstable	controllable	global	B	helped	CP2 B

Table 4.23: Causal Properties of 'Subject Difficulty' Cited by 2 Participants and Achievement Outcomes

	Combination of Causal Properties				Subject Difficulty		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***Repeated CP1 Outcome***
8	internal	stable	controllable	global	F	hindered	CP1 F
23	internal	stable	controllable	global	F	helped	CP1 D

Table 4.24: Causal Properties of 'Lack of Effort' Cited by 1 Participant and Achievement Outcomes

	Combination of Causal Properties				Lack of Effort		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***Repeated CP1***
16	internal	stable	controllable	global	CP1 F	helped	CP1 F

Table 4.25: Causal Properties of 'Appropriate Teaching Method' Cited by 5 Participants and Achievement Outcomes

	Combination of Causal Properties				Appropriate Teaching Method		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***CP2 Outcome***
29	external	stable	controllable	specific	A	helped	CP2 B
30	external	stable	controllable	specific	A	helped	CP2 A
31	external	stable	controllable	specific	A	helped	CP2 A
32	external	stable	controllable	specific	A	helped	CP2 B
34	external	stable	uncontrollable	specific	A	helped	CP2 C
36	external	stable	controllable	specific	A	helped	CP2 A

Causal properties of associate causes

Table 4.25, p.141, contains data pertaining to the 6 participants who attributed their achievement outcomes to 'appropriate teaching method'. They were high achievers. The findings here show that these 6 students perceived 'appropriate teaching method' identically on all dimensions except controllability, where only one student perceived it as uncontrollable. This causal attribution helped the achievement striving of all concerned participants.

Tables 4.26-4.29, pp.143-4, contain data pertaining to 4 participants who attributed their achievement outcomes to 'exam anxiety', 'cheating', 'lack of time', and 'unfair treatment'. The four causal attributions were perceived as unstable by the 4 students and they helped the achievement striving of their perceivers.

Table 4.26: Causal Properties of 'Exam Anxiety' Cited by 1 Participant and Achievement Outcomes

	Combination of Causal Properties				**Exam anxiety**		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***CP2 Outcome***
42	internal	unstable	uncontrollable	global	C	helped	UW

Table 4.27: Causal Properties of 'Cheating' Cited by 1 Participant and Achievement Outcomes

	Combination of Causal Properties				**Cheating**		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***CP2 Outcome***
18	external	unstable	controllable	specific	D	helped	C

Table 4.28: Causal Properties of 'Lack of Time' Cited by 1 Participant and Achievement Outcomes

	Combination of Causal Properties				Lack of Time		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***CP2 Outcome***
4	external	unstable	uncontrollable	global	B	helped	A

Table 4.29: Causal Properties of 'Unfair Treatment' Cited by 1 Participant and Achievement Outcomes

	Combination of Causal Properties				Unfair Treatment		
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***CP1 Outcome***	***Achievement Striving***	***CP1 Outcome***
27	external	unstable	controllable	specific	D	helped	C

Causal dimensions of causes by student achievement levels

Tables 4.30-4.34, pp.146-51, include 9 students each from the same achievement level. The numbers in the Participant column represent participants' numbers in the HyperResearh database. Participants' numbers do not necessarily appear in ascending order because students who made the same causal attribution were placed in adjacent rows to facilitate identifying patterns of causal properties within subgroups.

Table 4.30, p.146, contains data pertaining to the high achievers stratum of the sample. They attributed their achievement outcomes to 'appropriate learning strategy' and in 6 cases to 'appropriate teaching method'. All high achievers perceived 'appropriate learning strategy' internal, stable, and controllable. Only three of them perceived it as global. 'Appropriate teaching method' was illustrated in Table 4.25, p.141.

Table 4.31, p.147, contains data pertaining to the good achievers stratum of the sample where 4 different key causal attributions appeared. All good achievers perceived their causal attributions internal. Despite the apparent differences on the other dimensions, some homogeneity was present within subgroups. For instance, 'lack of study' was perceived as internal, unstable, and global, while 'appropriate learning strategy' was perceived internal, stable, and controllable. One participant cited an associate cause, 'lack of time', which was illustrated in Table 4.28, p.144.

Table 4.30: Causal Properties of Causal Attributions given by High Achievers

	Causal Properties					
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***Causal Attribution***	***CP2 Outcome***
13	internal	stable	controllable	global	Appropriate Learning Strategy	A
17	internal	stable	controllable	specific	Appropriate Learning Strategy	B
29	internal	stable	controllable	specific	Appropriate Learning Strategy	B
	external	stable	controllable	specific	Appropriate Teaching Method	
30	internal	stable	controllable	global	Appropriate Learning Strategy	A
	external	stable	controllable	specific	Appropriate Teaching Method	
31	internal	stable	controllable	specific	Appropriate Learning Strategy	A
	external	stable	controllable	specific	Appropriate Teaching Method	
32	internal	stable	controllable	specific	Appropriate Learning Strategy	B
	external	stable	controllable	specific	Appropriate Teaching Method	
34	internal	stable	controllable	specific	Appropriate Learning Strategy	C
	external	stable	uncontrollable	specific	Appropriate Teaching Method	
36	internal	stable	controllable	global	Appropriate Learning Strategy	A
	external	stable	controllable	specific	Appropriate Teaching Method	
39	internal	stable	controllable	specific	Appropriate Learning Strategy	C

Table 4.31: Causal Properties of Causal Attributions given by Good Achievers

	Causal Properties					
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***Causal Attribution***	***CP2 Outcome***
2	internal	unstable	controllable	global	Lack of Studying	A
10	internal	unstable	controllable	global	Lack of Studying	A
43	internal	unstable	uncontrollable	global	Lack of Studying	B
6	internal	stable	controllable	global	Appropriate Learning Strategy	A
15	internal	stable	controllable	global	Appropriate Learning Strategy	C
19	internal	stable	controllable	specific	Appropriate Learning Strategy	C
4	internal external	unstable stable	controllable uncontrollable	specific global	Lack of Practice Lack of Time	A
44	internal	stable	controllable	global	Lack of Practice	D
45	internal	unstable	controllable	global	Inappropriate Learning Strategy	B

Table 4.32: Causal Properties of Causal Attributions given by Satisfactory Achievers

	Causal Properties					
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***Causal Attribution***	***CP2 Outcome***
12	internal	stable	controllable	specific	Lack of Studying	D
24	internal	unstable	controllable	global	Lack of Studying	Course not taken
25	external	unstable	controllable	global	Lack of Studying	A
35	internal	unstable	controllable	specific	Lack of Studying	B
42	internal	stable	controllable	global	Appropriate Learning Strategy	Unofficial Withdrawal
	internal	unstable	uncontrollable	global	Exam anxiety	
21	internal	stable	uncontrollable	global	Inappropriate Learning Strategy	Course not taken
3	internal	stable	uncontrollable	global	Lack of Practice	F
7	internal	stable	uncontrollable	specific	Lack of Practice	D
40	internal	stable	uncontrollable	global	Lack of Practice	F

Table 4.32, p.148, contains data pertaining to the satisfactory stratum of the sample where 4 different key causal attributions appeared. Satisfactory achievers perceived their causal attributions differently on all dimensions. Homogeneity was present within the subgroup of 'lack of practice', which was perceived as internal, unstable, and global, while 'appropriate learning strategy' was perceived internal, stable, and uncontrollable. One participant cited an associate cause, 'exam anxiety', which was illustrated in Table 4.26, p.143.

Table 4.33, p.150, contains data pertaining to the passing achievers stratum of the sample where 3 different key causal attributions appeared. Passing achievers perceived their causal attributions differently on all dimensions. Two students cited associate causes which were illustrated in Table 4.29, p.144, and Table 4.31, p.147.

Table 4.34, p.151, contains data pertaining to the low achievers stratum of the sample where the highest number of key causal attributions appeared. Almost all low achievers perceived their causal attributions internal. Homogeneity was present within the subgroup of 'lack of study' which was perceived stable, uncontrollable, and global. Complete homogeneity was present within the subgroup of 'subject difficulty' and with 'lack of effort'.

Table 4.33: Causal Properties of Causal Attributions given by Passing Achievers

	Causal Properties					
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***Causal Attribution***	***Next Grade***
22	internal	stable	controllable	global	Lack of Studying	CP2 B
27	internal	unstable	controllable	global	Lack of Studying	CP1 C
	internal	unstable	controllable	specific	Unfair Treatment	
33	external	stable	controllable	global	Lack of Studying	CP2 B
37	external	stable	controllable	global	Lack of Studying	CP2 B
18	internal	stable	controllable	specific	Lack of Practice	CP2 C
	external	unstable	controllable	specific	Cheating	
28	internal	unstable	controllable	specific	Lack of Practice	CP2 F
41	external	unstable	specific	specific	Lack of Practice	CP2 B
9	internal	unstable	controllable	specific	Inappropriate Learning Strategy	CP2 B
26	internal	stable	controllable	global	Inappropriate Learning Strategy	CP2 F

Table 4.34: Causal Properties of Causal Attributions given by Low Achievers

	Causal Properties					
Participant	***Locus of Causality***	***Stability***	***Controllability***	***Globality***	***Causal Attribution***	***CP1 Outcome***
1	external	stable	uncontrollable	global	Lack of Studying	F
5	internal	stable	uncontrollable	global	Lack of Studying	F
11	internal	stable	uncontrollable	global	Lack of Studying	F
38	internal	unstable	controllable	global	Inappropriate Learning Strategy	D
14	internal/ external	stable	uncontrollable	global	Lack of Practice	F
20	internal	unstable	uncontrollable	specific	Lack of Practice	D
8	internal	stable	controllable	global	Subject Difficulty	F
23	internal	stable	controllable	global	Subject Difficulty	D
16	internal	stable	controllable	global	Lack of Effort	F

Hedonic or self-serving bias

Success was attributed by 19 participants to internal obstructive causal attributions (see Tables 4.31-4.34, pp.147-51). It is possible that the achievement outcome itself undermined their sense of self-worth which made some of them resolve to do better, implying that they did not lack ability (see Extract 4.17 below).

Extract 4.17 [Participant 3]

R: … the source of the cause has to do with me / I could have achieved better

Table 4.35: Achievement Outcomes in CP2 of 19 Participants Who Made Internal Obstructive Causal Attributions

Status of Achievement Outcomes in CP2	**Number of Participants**
Improved	8
Maintained	2
Lowered	7
CP2 not taken yet at interview time	2
Total	**19**

Of those 19 participants, eventually 8 reached a higher achievement level in CP2, 2 maintained their good achievement level, 7 obtained a lower achievement outcome, and 2 had not taken yet CP2 (see Table 4.35 above). This shows that the 8 students who had a higher CP2 outcome were honest in their cited causal attribution. Further, the 7 students who had a lower CP2 outcome expressed feeling guilty and being motivated by that feeling to achieve better. Thus, these students were not playing down the amount of study or practice they had undertaken. They needed help in using an 'appropriate learning strategy' to study for the course. In addition, the group of low achievers took personal responsibility for their failure too which asserts the absence of self-serving bias.

Research Question # 4

How does the stability dimension influence motivation and relate to students' expectations of future success?

Stability refers to whether the perceived cause remains the same or changes over time (see p.37). Weiner (2000, p.5) posited that the stability dimension maps into the expectancy determinant of the Expectancy-Value motivation model. The implication of this linkage is that subsequent behavior is determined by the expectation of future success which is evoked by the student's belief whether the cause of an outcome will be stable or unstable (Alderman 2008, pp.36-8).

Codes used to label segments of interview transcripts said by participants in response to this research question and its related probes are shown in lines 105–109 and 163-168 in Appendix E. Tables were used to reflect in concise format information revealed by participants. Each row displays the participant's number in the HyperResearch database, the causal attribution, how the causal attribution was perceived on the stability dimension, whether the latter instigated optimism and motivation, whether future success was expected, whether the repeated CP1 or CP2 was in progress or already completed, and the achievement outcomes in that course. Perceptions and feelings were revealed by participants in interviews. The tables' organization is the same as that of the tables in research question # 3.

Table 4.36, p.157, contains data pertaining to the high achievers. All of them perceived 'appropriate learning strategy' stable, felt optimistic and motivated to take CP2, expected future success, and eventually passed CP2.

Table 4.37, p.158, contains data pertaining to the good achievers. Despite the differences in perceiving their causal attributions on the stability dimension, all of them felt optimistic and motivated to take the next course in the sequence, expected future success, and eventually passed CP2.

The three good achievers who attributed their achievement outcome to 'lack of study' perceived it as unstable, felt optimistic about passing CP2, and were motivated to work for CP2. They expected future success in CP2 and eventually passed it whether they had taken the course before or were taking it at the interview time. Thus, perceiving 'lack of study' as unstable had a positive impact.

The only three good achievers who attributed their achievement outcome to 'appropriate learning strategy' perceived it as stable and felt optimistic about passing CP2, and motivated to work for CP2. They expected future success in CP2 and did actually pass it whether the interview took place after or in the course of the semester. Thus, perceiving 'appropriate learning strategy' as stable had a positive impact.

The two good achievers who attributed their achievement outcome to 'lack of practice' perceived it differently on the stability dimension, felt optimistic about passing CP2, and motivated to work for CP2. The student who perceived it as unstable, a positive view, improved his achievement outcome to A. Participant 44 (see Table 4.37, p.158) who perceived his obstructive causal attribution as stable, remained optimistic and motivated, expected to pass CP2, but obtained a lower achievement outcome. Participant 45 who perceived 'inappropriate learning strategy' as unstable, a positive view, maintained her achievement outcome.

Tables 4.37-4.38, pp.158-9, contain data pertaining to the satisfactory and passing achievers respectively. Despite the differences in perceiving their causal attributions on the stability dimension, almost all of them were optimistic and motivated to take the next course in the sequence. Almost all of them expected future success, but the next course outcomes varied from failing to passing with an excellent grade.

Three out of 4 satisfactory achievers who attributed their CP1 outcome to 'lack of study', and who perceived it as unstable, passed CP2 regardless of whether CP2 already had been taken or was in progress. Perceiving 'lack of study' as unstable which, is a positive outlook, triggered a feeling of optimism and motivation to learn. The fourth student had not taken yet CP2.

Participant 42, a satisfactory achiever, who perceived 'appropriate learning strategy' as stable, a positive outlook, was optimistic, motivated, and expected to pass CP2 which was in progress at interview time (see Table 4.38, p.159). This participant suffered from 'exam anxiety' in CP1. He started to skip classes after the interview and unofficially withdrew towards the end of the course. Participant 21 perceived 'inappropriate learning strategy' as stable, a negative outlook, felt pessimistic and unmotivated, and expected to fail CP2. This student changed his major.

Three out of 4 passing achievers (see Table 4.39, p.160) who perceived their obstructive causal attributions as stable, but were optimistic, motivated, and expected to pass CP2, actually passed it with a better achievement outcome. The fourth passing achiever failed the course. It is possible that the three students worked harder than their counterparts in the satisfactory group because they were closer to failure. Participant 22, a passing achiever, perceived 'lack of study' as stable, felt pessimistic and not motivated, and expected to fail CP2, but ended up passing with a B (see Table 4.39, p.160). Participant 28 perceived 'lack of practice' as unstable, felt optimistic and motivated, and expected to pass CP2, but ended up failing. Participant 41 perceived 'lack of practice' as unstable, felt optimistic and motivated, and expected to fail CP2, but ended up passing with a B.

Low achievers (see Table 4.40, p.162) perceived their causal attributions differently on the stability dimension, which made some of them optimistic and the others pessimistic, which in turn led some to be motivated and others

unmotivated. Even those who perceived their obstructive causal attribution as stable had different feelings about optimism and motivation. Despite all these differences, almost all of them expected future success, but eventually only three passed. There were only two low achievers who perceived their causes as unstable, felt optimistic and motivated, and expected to pass CP2, and passed. Two low achievers from among those who expected to pass the course failed it. Two others expected to fail, but did not.

Table 4.36: Consequences of Stability of High Achievers on Future Achievement Outcome – Expected and Actual

Participant	*Causal Attribution*	*Stability*	*Optimistic*	*Motivation*	*Future Success*	*CP2 Status*	**CP2 *Outcome***
13	Appropriate Learning Strategy	stable	optimistic	motivated	expected	in progress	A
17	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	B
29	Appropriate Learning Strategy	stable	optimistic	motivated	expected	in progress	B
30	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	A
31	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	A
32	Appropriate Learning Strategy	stable	optimistic	motivated	expected	in progress	B
34	Appropriate Learning Strategy	stable	optimistic	motivated	expected	in progress	C
36	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	B
39	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	C

Table 4.37: Consequences of Stability of Good Achievers on Future Achievement Outcome – Expected and Actual

Participant	*Causal Attribution*	*Stability*	*Optimistic*	*Motivation*	*Future Success*	*CP2 Status*	*CP2 Outcome*
2	Lack of Studying	unstable	optimistic	motivated	expected	taken before	A
10	Lack of Studying	unstable	optimistic	motivated	expected	in progress	A
43	Lack of Studying	unstable	optimistic	motivated	expected	taken before	B
6	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	A
15	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	C
19	Appropriate Learning Strategy	stable	optimistic	motivated	expected	taken before	C
4	Lack of Practice	unstable	optimistic	motivated	expected	taken before	A
44	Lack of Practice	stable	optimistic	motivated	expected	taken before	D
45	Inappropriate Learning Strategy	unstable	optimistic	motivated	expected	taken before	B

Table 4.38: Consequences of Stability of Satisfactory Achievers on Future Achievement Outcome – Expected and Actual

Participant	*Causal Attribution*	*Stability*	*Optimistic*	*Motivation*	*Future Success*	*CP2 Status*	*CP2 Outcome*
12	Lack of Studying	unstable	optimistic	motivated	expected	in progress	D
24	Lack of Studying	unstable	optimistic	motivated	expected	course not taken	
25	Lack of Studying	unstable	optimistic	motivated	expected	taken before	A
35	Lack of Studying	unstable	optimistic	motivated	expected	taken before	B
42	Appropriate Learning Strategy	stable	optimistic	motivated	expected	in progress	UW
21	Inappropriate Learning Strategy	stable	pessimistic	unmotivated	not expected	course not taken	
3	Lack of Practice	stable	optimistic	motivated	expected	in progress	F
7	Lack of Practice	stable	optimistic	motivated	expected	in progress	D
40	Lack of Practice	stable	optimistic	motivated	expected	in progress	F

Table 4.39: Consequences of Stability of Passing Achievers on Future Achievement Outcome – Expected and Actual

Participant	*Causal Attribution*	*Stability*	*Optimistic*	*Motivation*	*Future Success*	*CP2 Status*	*Next Grade*
18	Lack of Practice	stable	optimistic	motivated	expected	taken before	CP2 C
28	Lack of Practice	unstable	optimistic	motivated	expected	in progress	CP2 F
41	Lack of Practice	unstable	optimistic	motivated	not expected	taken before	CP2 B
22	Lack of Studying	stable	pessimistic	unmotivated	not expected	taken before	CP2 B
27	Lack of Studying	unstable	optimistic	motivated	expected	taken before	CP1 C
33	Lack of Studying	stable	optimistic	motivated	expected	taken before	CP2 B
37	Lack of Studying	stable	optimistic	motivated	expected	taken before	CP2 B
9	Inappropriate Learning Strategy	unstable	optimistic	motivated	expected	in progress	CP2 B
26	Inappropriate Learning Strategy	stable	optimistic	motivated	expected	in progress	CP2 F

All low achievers who perceived ‘lack of study’ as stable failed. Participant 38, who perceived it as unstable, passed. The same applies on ‘lack of practice’, ‘lack of effort’, and in one case ‘subject difficulty’. This supports the previous proposal that when students from different achievement levels attribute their outcomes to an obstructive cause such as ‘lack of study’ and perceive it as stable, the past magnitude of ‘lack of study’ serves as a spur in determining their future success or failure. 6 out of 7 failing achievers who perceived their obstructive causal attributions as stable failed again. Four out of 5 passing achievers who perceived their obstructive causal attributions as stable passed CP2. One out of 3 satisfactory achievers who perceived their obstructive causal attributions as stable and completed CP2 passed the course. The only one good achiever who perceived his obstructive causal attribution as stable passed CP2.

Table 4.41, p.163, presents the data of the five tables that belong to this research question in a concise format. The data are divided by achievement outcomes into two groups, success (A, B, C, D) and failure (F). Within these groups the data were again divided by type, supportive and obstructive. It was important to show the number of students who perceived their causal attributions as stable or unstable, who expected future success or failure, and to note whether they eventually passed CP2 or the repeated CP1.

Table 4.40: Consequences of Stability of Low Achievers on Future Achievement Outcome – Expected and Actual

Participant	*Causal Attribution*	*Stability*	*Optimistic*	*Motivation*	*Future Success*	*Repeated CP1 Status*	*CP1 Outcome 2nd Time Taken*
1	Lack of Studying	stable	pessimistic	unmotivated	expected	taken before	F
5	Lack of Studying	stable	optimistic	unmotivated	expected	taken before	F
11	Lack of Studying	stable	pessimistic	unmotivated	expected	taken before	F
38	Inappropriate Learning Strategy	unstable	optimistic	motivated	expected	in progress	D
8	Subject Difficulty	stable	optimistic	motivated	expected	taken before	F
23	Subject Difficulty	stable	pessimistic	motivated	expected	taken before	D
14	Lack of Practice	stable	optimistic	unmotivated	expected	in progress	F
20	Lack of Practice	unstable	optimistic	motivated	expected	in progress	D
16	Lack of Effort	stable	pessimistic	unmotivated	not expected	taken before	F

Table 4.41: Stability Dimension – Expectancy of Future Success – Achievement Outcomes

CP1 Outcome	*Type of Causal Attribution*	*Stable*	*Not Stable*	*Future Success Expected*	*Future Success Not Expected*	*Pass*	*Fail*	*Not Taken*
A, B, C, D	supportive	13		13		12	1	
A, B, C, D	obstructive	10	13	20	3	17	4	2
F	obstructive	7	2	8	1	3	6	
	Subtotal	**30**	**15**	**41**	**4**	**32**	**11**	**2**
	Total	**45**		**45**		**45**		

Research Question # 5

How do the locus of causality and controllability dimensions influence motivation and relate to the value determinant of motivation?

Controllability refers to whether the perceived cause is subject to volitional alteration (see p.37). Weiner (2000, p.5) posited that the locus of causality and the controllability dimensions map into the value determinant of the Expectancy-Value motivation model. The implication of this linkage is that subsequent behavior is shaped by a collection of emotions that are evoked by the student's belief whether the cause of an outcome is internal or external on the locus of causality dimension and controllable or uncontrollable on the controllability dimension (Alderman 2008, pp.36-8).

Codes used to represent what participants said in response to this research question and its related probes are shown in lines 144–149 and 153–158 in Appendix E. Each table includes 9 participants. Each row of the five tables below displays the state of two emotions investigated in relation to locus of causality: pride and self-esteem and the state of 5 emotions investigated in relation to controllability: guilt, anger, pity, shame, and gratitude. The interview extract below illustrates self-confidence [R = participant's response].

Extract 4.18 [Participant 28]

R: I became motivated, definitely. When the problem occurred I hated programming / when I practised and learned how to solve the problem I became more confident which motivated me / when programs start functioning well you become happy, you have made an achievement

Throughout Tables 4.41-4.45 the following signs are used: ↑ = increased; ↔ = not affected; ↓ = decreased. For example, in Table 4.42, p.166, participant 13 said that the locus of causality of 'appropriate learning strategy' was internal which

increased (↑) her pride and self-esteem. The meaning of (↑↔) is that while motivation was increased (↑) by pride, it was not affected (↔) by an increase in her self-esteem. Since she was in control of the cause, she did not feel guilty, angry, pity, shame, but gratitude. Gratitude was the only feeling that motivated her.

Table 4.42, p.166, shows that all high achievers attributed their CP1 outcomes to 'appropriate learning strategy', which they perceived as internal and controllable. Further, all high achievers valued CP1 and passed CP2. The findings revealed that they were motivated by an increase in pride, self-esteem, or both. Also, they were motivated by a feeling of gratitude.

Table 4.43, p.167, contains data pertaining to good achievers. Many good achievers were motivated by an increase in pride, self-esteem, or both. One student was motivated by a decrease in pride. Two students did not feel any change in pride or self-esteem. In addition, many students (7 participants) were motivated by one or more feelings related to the controllability dimension. All good achievers valued CP1 and passed CP2. Participant 44 was not asked about shame because he obtained a B^+ and he said he was very happy with the grade. Also, Participant 45 was not asked about shame because the researcher felt that the tone of the answer to the question on pity showed some discontent.

Table 4.44, p.168, contains data pertaining to satisfactory achievers. Similar to the previous group, they gave 4 different causal attributions. Some satisfactory achievers were motivated by a decrease in feeling, while students from the previous groups were motivated by an increase in feeling. The only student who felt unmotivated was the only one who did not value CP1. Satisfactory achievers were motivated by emotional consequence of controllability, or a combination of locus of causality and controllability.

Table 4.42: Consequences of Locus of Causality and Controllability on Future Achievement Outcome / Value of Course – High Achievers

Participant	Causal Attribution	Locus of Causality	Pride	Self-esteem	Motivation	Controllable	Guilt	Anger	Pity	Shame	Gratitude	Motivation	Course Valued	Next Grade
13	Appropriate Learning Strategy	internal	↑	↑	↑↔	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	A
17	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	B
29	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	B
30	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	A
31	Appropriate Learning Strategy	internal	↔	↑	↔↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	A
32	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	B
34	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	C
36	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	A
39	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	C

Table 4.43: Consequences of Locus of Causality and Controllability on Future Achievement Outcome / Value of Course – Good Achievers

Participant	Causal Attribution	Locus of Causality	Pride	Self-esteem	Motivation	Controllable	Guilt	Anger	Pity	Shame	Gratitude	Motivation	Course Valued	Next Grade
2	Lack of Studying	internal	↑	↔	↑↔	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	A
10	Lack of Studying	internal	↔	↔	↔↔	controllable	yes	↔	yes	yes	↔	↑↔↔↔↔	yes	A
43	Lack of Studying	internal	↑	↔	↑↔	uncontrollable	↔	yes	↔	↔	yes	↔↔↔↔↑	yes	B
6	Appropriate Learning Strategy	internal	↔	↑	↔↑	controllable	yes	↔	yes	↔	↔	↔↔↔↔↔	yes	A
15	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	C
19	Appropriate Learning Strategy	internal	↑	↑	↑↑	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	C
4	Lack of Practice	internal	↔	↔	↔↔	controllable	↔	↔	yes	↔	yes	↔↔↔↔↑	yes	A
44	Lack of Practice	internal	↓	↔	↑↔	controllable	yes	↔	↔	NP	yes	↑↔↔NP↑	yes	D
45	Inappropriate Learning Strategy	internal	↑	↑	↑↑	controllable	yes	↔	yes	NP	yes	↑↔↔NP↑	yes	B

Table 4.44: Consequences of Locus of Causality and Controllability on Future Achievement Outcome / Value of Course – Satisfactory Achievers

Participant	Causal Attribution	Locus of Causality	Pride	Self-esteem	Motivation	Controllable	Guilt	Anger	Pity	Shame	Gratitude	Motivation	Course Valued	Next Grade
12	Lack of Studying	internal	↓	↔	↑↔	controllable	yes	↔	↔	yes	yes	↑↔↔↑↔	yes	CP2 D
24	Lack of Studying	internal	NP	↑	NP ↑	controllable	↔	yes	↔	↔	yes	↔↑NANA↑	yes	course not taken
25	Lack of Studying	external	↓	↔	↑↔	controllable	yes	yes	↔	↔	yes	↑↑↔↔↑	yes	CP2 A
35	Lack of Studying	internal	↔	↓	↔↑	controllable	yes	yes	↔	↔	yes	↑↑↔↔↑	yes	CP2 B
42	Appropriate Learning Strategy	internal	↔	↔	↔↔	controllable	↔	↔	↔	↔	yes	↔↔↔↔↑	yes	UW
21	Inappropriate Learning Strategy	internal	↔	↔	↔↔	uncontrollable	yes	yes	yes	↔	yes	↔↓↓↔↔	no	course not taken
3	Lack of Practice	internal	↓	↔	↑↔	uncontrollable	yes	↔	yes	yes	↔	↑↔↑↑↔	yes	CP2 F
7	Lack of Practice	internal	↓	↔	↑↔	uncontrollable	yes	yes	yes	yes	yes	↑↑↑↑↑	yes	CP2 D
40	Lack of Practice	internal	↔	↔	↔↔	uncontrollable	yes	yes	yes	↔	↔	↑↑↑↔↔	yes	CP2 F

Table 4.45, p.170, shows that passing achievers cited 3 different causal attributions. Almost all of them were motivated by a decrease in pride, self-esteem, or both. More affective consequences were expressed in relation to controllability. Passing achievers were motivated by emotional consequence of controllability alone, or controllability and locus of causality together (see Table 4.45, p.170). Although all of them were motivated, two students did not value CP1. Participant 18 was not asked the question about gratitude because he said that another student was caught cheating from him which made the teacher penalize him by removing lots of points while the other student failed the course.

Table 4.46, p.171, contains data pertaining to low achievers. There were 4 different causal attributions. This group tended to perceive their cause as internal (7 participants) rather than external (1 participant). Participant 14, Table 4.46, p.171, perceived 'lack of practice' as internal and external. Similar to the satisfactory and passing groups, some low achievers were motivated by a decrease in self-esteem (1 participant), or a decrease in both pride and self-esteem (3 participants). Participant 5's motivation was decreased by a decrease in pride and self-esteem, while participant 23's motivation was not affected by a decrease in both (see Table 4.46, p.171). Students were more motivated by emotions related to the controllability dimension than stability. Participants 5 and 11, Table 4.46, p.171, felt at the same time motivated by some emotions and unmotivated by others. This group contained the highest number of students (5) who did not value CP1 of which four failed. Two of those who liked the course failed it. It was not possible to ask all low achievers about gratitude because the interviewer felt that it would have put them at unease.

Table 4.45: Consequences of Locus of Causality and Controllability on Future Achievement Outcome / Value of Course – Passing Achievers

Participant	Causal Attribution	Locus of Causality	Pride	Self-esteem	Motivation	Controllable	Guilt	Anger	Pity	Shame	Gratitude	Motivation	Course Valued	Next Grade
18	Lack of Practice	internal	↓	↓	↑↔	controllable	yes	yes	yes	yes	NP	NP↑↑↑↑	yes	CP2 C
28	Lack of Practice	internal	↓	↓	↑↑	controllable	yes	yes	yes	yes	yes	↑↑↑↑↑	yes	CP2 F
41	Lack of Practice	external	↔	↓	↔↑	uncontrollable	yes	yes	↔	↔	yes	↑↑↔↔↑	no	CP2 B
22	Lack of Studying	internal	↓	↔	↑↔	controllable	↔	yes	↔	↔	yes	↔↑↔↔↑	no	CP2 B
27	Lack of Studying	internal	↓	↔	↑↔	controllable	yes	yes	yes	yes	yes	↑↑↑↑↑	yes	CP1 C
33	Lack of Studying	external	↔	↔	↔↔	controllable	yes	yes	yes	↔	yes	↑↑↑↑↑	yes	CP2 B
37	Lack of Studying	external	NP	↔	NP ↔	controllable	↔	↔	yes	NP	yes	↔↔↑NP↑	yes	CP2 B
9	Inappropriate Learning Strategy	internal	↓	↔	↑↔	controllable	yes	yes	yes	yes	↔	↑↔↑↔↔	yes	CP2 B
26	Inappropriate Learning Strategy	internal	↔	↑	↑↑	controllable	yes	yes	↔	yes	yes	↑↑↔↑↑	yes	CP2 F

Table 4.46: Consequences of Locus of Causality and Controllability on Future Achievement Outcome / Value of Course – Low Achievers

Participant	Causal Attribution	Locus of Causality	Pride	Self-esteem	Motivation	Controllable	Guilt	Anger	Pity	Shame	Gratitude	Motivation	Course Valued	CP1 0utcome 2nd Time
1	Lack of Studying	external	↔	↔	↔↔	uncontrollable	yes	↔	↔	↔	NP	↑↔↔↔NP	no	F
5	Lack of Studying	internal	↓	↓	↓↓	uncontrollable	↔	yes	yes	yes	yes	↔↓↑↑↔	no	F
11	Lack of Studying	internal	↓	↓	↑↔	uncontrollable	↔	yes	yes	↔	↔	↔↑↓↔↔	no	F
38	Inappropriate Learning Strategy	internal	↔	↔	↔↔	controllable	↔	↔	yes	↔	NP	↔↔↑↔NP	no	D
8	Subject Difficulty	internal	↔	↓	↔↑	controllable	yes	yes	yes	no	NP	↑↑↑↔ NP	no	F
23	Subject Difficulty	internal	↓	↓	↔↔	controllable	yes	yes	yes	no	NP	↑↔↑↔ NP	yes	D
14	Lack of Practice	internal/ external	NA	↔	NA ↔	uncontrollable	yes	yes	yes	↔	NP	↑↔↑↔ NP	yes	F
20	Lack of Practice	internal	↓	↓	↑↔	uncontrollable	yes	yes	yes	yes	↔	↑↑↑↑↔	yes	D
16	Lack of Effort	internal	↔	↔	↔↔	controllable	yes	no	no	no	yes	↔↔↔↔↔↑	yes	F

Research Question # 6

What actions will students take on computer programming courses in the future from an attributional perspective?

Response of students to Computer Programming 1 (CP1) course outcomes

In research questions 4 and 5, the focus was on emotions triggered following the identification of a causal attribution. However, the course outcome itself triggers immediate emotions that have a role in determining action related to subsequent similar tasks (see p.28). The findings in Table 4.47, p.173, show participants' emotional reactions to course outcome. More participants were unhappy than happy. Having no high achiever sad and no low achiever happy adds credibility to the study. While six low achievers were sad, three felt satisfied. In Extract 4.19 below, participant 1, a low achiever, expresses his satisfaction with his course outcome [Q = interviewer's question, R = participant's response]:

Extract 4.19 [Participant 1]

Q: Were you frustrated about your grade?

R: I deserve it

The three low achievers who felt satisfied failed the course again. Three low achievers who felt sad failed the course again. Only three low achievers felt sad and passed the course when repeated, with a D. Three non-achievers felt sad, but failed CP2. Thus, the feeling of sadness upon the receipt of CP1 outcome, whether it was success or failure, was not sufficient for participants to pass CP2. Two non-achievers felt happy, but failed CP2.

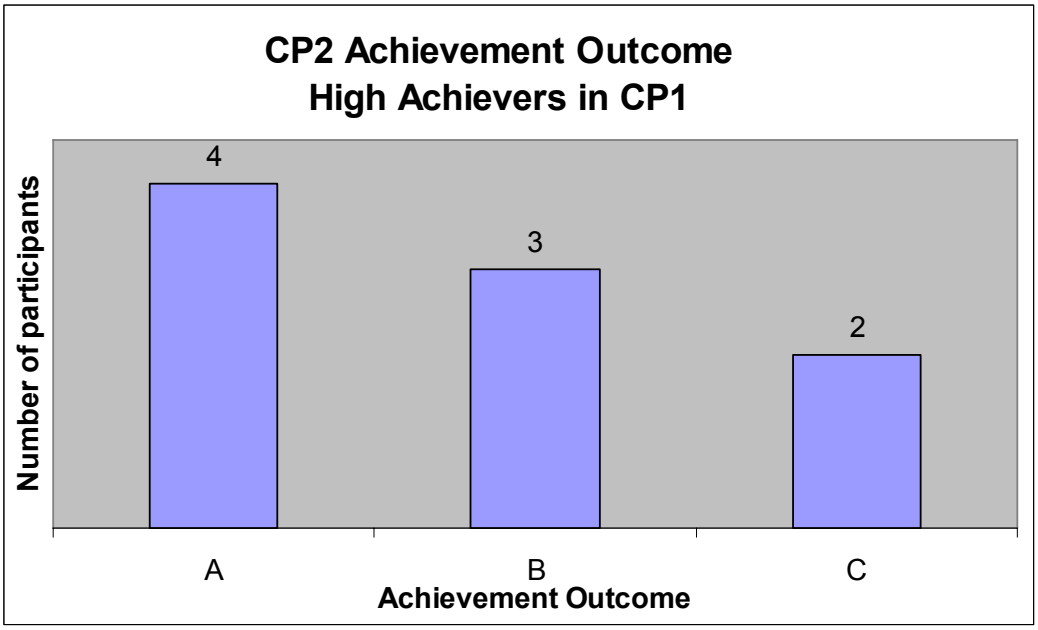
Table 4.47: Immediate Emotional Reaction upon Receipt of CP1 Outcome and Their Distribution by Achievement Outcome

Outcome	A	B	C	D	F	Total	Percent
Sad		3	5	6	6	20	44.4%
Happy	9	4	1	3		17	37.8%
Satisfied		2	3		3	8	17.8%
Total	**9**	**9**	**9**	**9**	**9**	**45**	**100%**

Prediction of future success and failure

Chart 4.5 below shows that all high achievers passed CP2. However, not all of them maintained the same achievement level.

Chart 4.5: High Achievers



The findings below support to a great extent the belief that the usefulness of causal attributions lies in their properties (see pp.33-9). Several patterns of causal properties emerged in relation to predicting improvement or deterioration in students' motivation for learning similar programming courses, irrespective of

the achievement level. Each table below represents one pattern and illustrates its consequences on subsequent action. Each row contains the number of participants pertaining to every achievement level who improved, maintained, lowered, or did not take the next course. Empty cells reflect the absence of students who perceived their causal attribution with the combination of causal properties under focus.

Table 4.48 below shows that the majority of participants who perceived their causal attribution as unstable and controllable did not maintain the same achievement outcomes.

Table 4.48: CP2 Outcome of 12 Participants Who Said That Their Causal Attributions Were Unstable and Controllable

Previous Achievement Outcome / New Achievement Outcome	Improved	Maintained	Lowered	Failed	Not taken	Total
High						0
Good	2	1		1		4
Satisfactory	2		1		1	4
Passing	1			2		3
Low	1					1

Table 4.49, p.175, shows that the majority of participants who perceived their causal attribution as stable and uncontrollable lowered their achievement outcomes. Extract 4.12, p.124, and Extract 4.20 below illustrate this point.

Extract 4.20 [Participant 14]

R: No, it will not change / you have to fix it / I am trying hard to fix it / I have decreased the number of shifts at work / had I kept the same work load and the same number of courses nothing would have changed because I will have no time available for studying / now the situation have slightly changed / now it is better than before / I reduced the number of working days from 6 or 7 days per week to 5 days per week, and the number of credits from 15 to 12 / I am leaving space to be able to study and to be ready psychologically to study, so that I will not be tired when I decide to study

Table 4.49: CP2 Outcome of Participants Who Said That Their Causal Attributions Were Stable and Uncontrollable

Previous Achievement Outcome / New Achievement Outcome	Improved	Maintained	Lowered	Failed	Not taken	Total
High						0
Good						0
Satisfactory			1	2	1	4
Passing						0
Low				4		4

Additional failure made some students develop learned helplessness in computer programming. Their persistence faded away after losing hope for effecting a change in the future, which led them to think of dropping out from the University or to change their major. Extract 4.21 below is an example.

Extract 4.21 [Participant 8]

R: Frankly, because of this course, I changed my major / I thought that if this is the easiest course in computer programming and my outcome is as such, why then

should I enter this route that is not meant for me / in the old days, I thought that I have some knowledge about computers, I found out that I do not know / it is not that I do not know, I did not like to know more

Table 4.50 below shows that the majority of participants who perceived their causal attribution as stable and controllable passed their achievement outcomes.

Table 4.50: CP2 Outcome of Participants Who Said That Their Causal Attributions Were Stable and Controllable

	Next Achievement Outcome					
Previous Achievement Outcome	**Improved**	**Maintained**	**Lowered**	**Failed**	**Not taken**	**Total**
High		4	5			9
Good	1		3			4
Satisfactory					1	1
Passing	4			1		5
Low	1				2	3

CHAPTER V

ANALYSIS AND DISCUSSION

Two Illustrative Case Studies

Case study 1: A participant with a successful outcome

Karim (pseudonym) is a 22 years old male student. He was in the Junior year when he participated in this study, during the spring 2007 semester. His achievement outcome in Computer Programming 1 was B. He told the interviewer that he felt happy upon the receipt of his grade and that he expected it. Karim's Case Card number in HyperResearch was 19. Accordingly, he is participant 19. When asked about the cause of his achievement outcome, Karim told the interviewer:

R: The cause is my concentration in class and studying / I did not depend on solely the information in the course handouts / I developed myself in several programming areas to achieve better results in exams / I worked hard by doing practice and by participating in class discussions / these techniques improve the course outcome

So for this participant the prime cause of his success he attributed to having an appropriate learning strategy. In the Code List Editor, this causal attribution is numbered as 30. Karim did not cite a second cause. When asked about the locus of the causal attribution 'appropriate learning strategy', Karim said:

R: Definitely, it is me. Definitely, it is not someone else.

Perceiving the cause as internal had some psychological consequences on him (Weiner 2000, p.3). His response to whether his self-esteem was affected was:

R: Certainly, the cause affected it very much. I was proud of myself especially that programming is a major course. I felt that I am good in programming because I did very well in this course.

In addition to enhancing his pride (Santrock 2001, p.401), Karim mentioned gaining self-confidence too:

R: I am demonstrating to the teacher that I am capable of developing applications and that I have confidence in myself which is a very important factor. I have confidence in myself. Confidence is the most important issue.

Here, the interviewer posed the following question to find out where Karim locates his causal attribution on the stability dimension:

Q: Was the cause of your achievement stable over time?
R: Yes, sure. The cause continued to be present, but I chose not to work for one particular course.
Q: When you obtained the B you perceived the cause as stable.
R: Yes, I perceived the learning strategy as stable.

This shows that Karim was motivated to apply an 'appropriate learning strategy' to courses he would take in the future. That is, he perceived his prime cause of motivation as stable over time. Still, his words 'I chose not to work for one particular course' indicate that the implementation of an 'appropriate learning strategy' was in his hands.

Two questions related to stability followed, but the interviewer got very short answers.

Q: Did this view of the cause make you hopeful of passing the next course CSC 217?

R: Sure.

Q: Did you expect to pass the next course CSC 217?

R: Yes.

According to attribution theory (Elliott et al. 2005 p.18), perceiving his causal attribution as stable made Karim hopeful of passing the next course in the sequence, and consequently he expected to pass it with increased certainty (Weiner 1986, p.115). Weiner (1986) called this the 'Expectancy Principle'.

Next, Karim showed an intrinsic interest in programming. Also, he valued the course irrespective of whether it is on his academic program's contract sheet.

R: Programming is my hobby. I like programming very much. I like programming not only because it is part of my major. I like writing programs for the sake of programming and it is not because I am obliged to study programming. I am not obliged. I like to produce impressive applications.

Liking the subject area had an influence on Karim and guided his causal attribution 'appropriate learning strategy' (Vispoel and Austin 1995, p.381). Karim's words 'Programming is my hobby' in the quotation above is considered a causal antecedent of type 'liking programming'. In the Code List Editor, this causal antecedent is numbered as 23. The remaining text in the quotation above shows that Karim valued the course. In the Code List Editor, the code that represents valuing the course is numbered as 85. The valuing of CP1 motivated Karim to 'produce impressive applications' as he mentioned above. This shows that the value determinant of the Expectancy-Value motivation model had a positive impact on Karim's motivation.

To find out how Karim perceived his causal attribution with respect to all his other courses, the researcher asked:

Q: Did the cause of your achievement influence your achievement just in the computer programming course or all other subject areas you were taking simultaneously with CSC 216?

Karim's answer was:

R: I felt that some courses were unpleasant which has an influence, definitely. This has an influence. It has an influence

The above quotation shows that Karim was not motivated to apply an 'appropriate learning strategy' to all the courses he was taking the same semester with the computer programming 1 course. That is, he perceived his prime cause of motivation as specific to the subject under focus.

Regarding controllability, Karim felt that he was able to control the implementation of an 'appropriate learning strategy' to courses he could take in the coming semesters. That is, he perceived his prime cause of motivation as controllable. The following dialogue took place during the interview:

Q: Did you feel that the cause was under or beyond your control?
R: I was responsible.
Q: You were responsible, but were you in control?
R: I can say that I was in control.
Q: You were in control.
R: Yes.

Here, the researcher felt that there is more to say about the controllability issue. So, to explore this further with Karim, the researcher asked:

Q: Why you said that you can say, is there another issue?

Karim gave the following firm answer:

R: No, I felt that I was in control.

The researcher felt that most likely Karim does not want to say more about this at the time. However, this issue was brought up in the second interview which is illustrated later.

According to the attribution theory, the controllability dimension of a causal attribution to success influences gratitude (Schultz and Oskamp 2000, p.45). Hence, Karim was asked about gratitude and he said:

R: When I took the grade, I felt that I am good in programming and that the teacher gave me the grade that I deserved.

This made him feel motivated to take the remaining computer programming courses in the sequence:

R: It helped me improve in many areas / it made me like the courses that were yet to come / there are more difficult courses in the programming sequence

Karim attributed his achievement outcome in the first course in the sequence of computer programming courses, CP1, to using an 'appropriate learning strategy'. He perceived the underlying properties of 'appropriate learning strategy' as internal, stable, controllable, and specific. The internal and controllable properties generated an increase in self-esteem, pride, and self-confidence accompanied with gratitude. Perceiving the causal attribution of his achievement outcome as stable promoted in him an expectation of future success in the remaining computer programming in the sequence despite his belief that they will be more difficult. It also generated a feeling of hopefulness of a similar achievement outcome in CP2. Consequently, the psychological consequences of attributing his

achievement outcome to 'appropriate learning strategy' encompassed a number of emotional outcomes an increase in self-esteem, pride, self-confidence, and hopefulness, and a single cognition of high expectancy of future success. These psychological consequences along with the feeling of happiness immediately felt following the receipt of the course outcome motivated Karim to strive for a better achievement. He said:

R: I will be improving my grade.

From the attribution theory perspective (Berliner 2006; Alderman 2008, p.27), Karim's motivation should influence his subsequent behaviour. The best way to confirm this belief or reject it was to get Karim's achievement outcome in the next taken computer programming course. It was obtained from his records based on his permission (see Appendix C). It was a C^{+} which confirms the prediction of attribution theory.

In the second interview, the issue of getting a lower letter grade in CP2 than CP1 was brought up. Karim's comment was:

R: I expected to take more than a B / however, I fell under pressure and I was not in control / I was not in control as much as I was in the first course / still, I obtained a good grade / now I know how to learn some features of the first course for the next course to improve my grade, absolutely

This indicates that Karim's words during the first interview 'I can say I was in control' were hiding something from the interviewer. This thing reappeared while taking CP2 in a form called 'pressure' by Karim. Since CP2 is more difficult, this pressure seems to have had a negative influence on Karim's motivation to learn computer programming. Again, this shows the power of attribution theory.

Case study 2: A participant with a failing outcome

Sami (pseudonym) is a 25 years old male student. He was in the Senior year when he participated in this study, during the spring 2007 semester. His achievement outcome in Computer Programming 1 was F. He told the interviewer that he felt unhappy upon the receipt of the grade and that he did not expected it. Sami's Case Card number in HyperResearch was 5. Accordingly, he is participant 5. When asked about the cause of his achievement outcome, Sami told the interviewer:

R: I did not study well, the right way / I used to enter the class I took it the first semester / I used to enter carelessly / did not attend / did not study / read them a little bit just before the exam / our exam was not on the computer, on paper / I failed the course

Q: What was then the cause that led to underachievement?

R: Lack of studying / lack of studying / because I was not attending the class enough I used not to understand and the like

Q: Which evidence asserted to you that was the reason of the course outcome?

R: In VB 2 I was attending and I was studying very hard I got B+ / when I took the decision to study I passed with B+

So for this participant the prime cause of his failure he attributed to having a lack of study. In the Code List Editor, this causal attribution is numbered as 34. Sami did not cite a second cause. In response to the question about the locus of the causal attribution 'lack of study', Sami said:

R: I was the cause / basically I was the cause / as I mentioned it was lack of studying

Perceiving the cause of failure as internal had negative psychological consequences on him (Santrock 2001, p.401). His response to whether his pride was affected was:

R: It lowered my pride.

Q: How did this feeling about your pride affect your motivation to repeat the course? To study for the next course?

R: It lowered my pride and it lowered my motivation to study because I thought at that time that I was studying.

Sami's pride and self-esteem were lowered which in turn lowered his motivation to study as he mentioned in the extract above. According to attribution theory, a decrease in pride or self-esteem does not help achievement striving in similar tasks (Weiner 2000, p.3).

Here, the interviewer asked Sami whether he thought that his causal attribution will change over time, Sami replied:

R: it lasted until much later, until last year / last year when I started to study and got 16 and passed them only then I started to realize that everything I did in the past was in my hands

Since the cause lasted for some time, Sami was asked whether he felt that he will pass the course the next time he repeats it, Sami said:

R: the second time I thought that I am repeating the course so I am not going to repeat it again, I will not fail it

So, despite Sami's conviction that the cause of his failure was stable, he expected to pass the course the second time he enrolled in it.

Here, the interviewer asked Sami whether he felt the cause of his failure was controllable, Sami answered:

R: For sure no. It was a period of frivolousness. Now when I have a lesson, I sit down and study the material and understand it. Before, when I used to have some work to do, I sit down and do them just to finish my lesson.

According to the attribution theory, the controllability dimension influences the participant's feelings of shame, guilt, anger, pity, and gratitude (Schultz and Oskamp 2000, p.45). Thus, the researcher asked about those emotions as follows:

Q: Did you feel guilty?
R: No.
Q: Did you feel angry?
R: I felt angry at the teacher.
Q: How did this feeling of anger affect your motivation to study for the next course?
R: This lowered my motivation
Q: Did you feel shame?
R: Yes.
Q: How did this feeling of shame affect your motivation to study for the next course?
R: I decided to pass the course.
Q: Did you feel pity?
R: Yes.
Q: How did this feeling of pity affect your motivation to study for the next course?
R: A bit increased
Q: Did you have a feeling of gratitude?
R: No.

While feeling angry lowered Sami's motivation, feeling shame and pity made him persist to take the course and pass it. Faced with all these mixed feelings, the researcher asked Sami whether he liked the course and the answer came quick, short and decisive 'no'.

Regarding globality, that is whether ‘lack of study’ affected also the other courses that he was enrolled in simultaneously with the computer programming 1 course, Sami said:

R: overall I did not study for all my courses / it is something internal within me before for two semesters / the first semester I took three Fs one of them was CP1 / it was the first semester and I did not associate closely with studying / I was not studying

This shows that Sami was not motivated to undertake any achievement-related activities. His ‘lack of study’ encompassed all the courses he was enrolled in at the same time with the computer programming 1 course. That is, his causal attribution was not specific to the computer programming subject discipline but global to all other subjects.

In the second interview, this issue was brought up again and here is what Sami said:

R: before I was frivolous, lost, careless

Carelessness had an influence on Sami and guided his causal attribution ‘lack of study’. Sami’s words ‘I was frivolous, lost, careless’ in the quotation above were considered a causal antecedent and were coded ‘carelessness’. In the Code List Editor, this causal antecedent is numbered as 16.

Sami attributed his achievement outcome in the first course in the sequence of computer programming courses, CP1, to ‘lack of study’. He perceived the underlying properties of ‘lack of study’ as internal, stable, uncontrollable, and global. The internal and uncontrollable properties generated a decrease in pride and self-esteem, and feelings of anger, shame, and pity. While the decrease in pride, self-esteem, and the feeling of anger lowered his motivation, the feelings of shame and pity made him decide to pass. Despite his perception of ‘lack of study’

as stable, he expected to pass the course the next time he repeats it. This might seem in contradiction with the belief that attribution of failure to stable factors decreases the expectation of future success (Seifert 2004, p.140). However, a decrease in expectation of future success is one thing and expecting future failure is another. So, it seems that for Sami there was still room for hope. This feeling of hope coupled with the psychological consequences that resulted from shame, pity, and sadness that was immediately felt following the receipt of the course outcome made Sami decide to repeat the course. However, Sami took no action towards a better achievement except that of enrolling in the course again. The interviewer had one more question for him:

Q: Did you take any action to improve the situation?
R: No.

From the attribution theory perspective (Berliner 2006; Alderman 2008, p.27), Sami's lowered motivation should also influence his subsequent behaviour. The best way to confirm this belief or reject it was Sami's achievement outcome in the next taken computer programming course. However, Sami mentioned in the interview that he failed the course the second time which confirms the prediction of attribution theory. That is, when an obstructive causal attribution is perceived as internal, stable, and uncontrollable, the perceiver is most likely going to fail on the same task again.

This section included two illustrative case studies. While the first case study illustrated the case of a participant (Karim: pseudonym) with a successful outcome, the second case study illustrated the case of a participant (Sami: pseudonym) with a failing outcome. This strategy conformed to attribution theory of motivation and helped in understanding the role of motivation in the success and failure of the two aforementioned learners (Berliner 2006). The analysis of the first case study showed that Karim's attribution of his success to a supportive causal attribution and his perception of the cause as internal, stable, controllable,

and specific had psychological consequences that motivated him. In accordance with attribution theory, Karim passed the second course in the sequence. Furthermore, the analysis of Karim's case is in agreement with the other cases where participants perceived their supportive causal attribution with causal properties similar to Karim's: internal, stable, controllable, and specific (see Table 4.20). The analysis of the second case study showed that Sami's attribution of his failure to an obstructive causal attribution and his perception of the cause as internal, stable, uncontrollable, and global had psychological consequences that lowered his motivation. In accordance with attribution theory, Sami failed the course a second time. Furthermore, the analysis of Sami's case is in agreement with the other cases where participants perceived their obstructive causal attribution with causal properties similar to Sami's: internal, stable, uncontrollable, and global (see Table 4.32 and Table 4.34). The majority of these participants either failed the course a second time or changed their academic programme. After all, the two illustrative case studies exemplified in-depth the inter-relationship between the causal attributions made by Karim and Sami about their computer programming course achievement outcome, and their subsequent motivation and achievement (Martin 2002, p.37). Although lengthy, these in-depth examinations of interview data form a better approach to the analysis of qualitative data than presenting it in tables as a linear relationship.

Six research questions were developed to fulfil the purpose of this case study. What follows is an analysis of the findings as they relate to each research question and the literature review.

Research Question # 1

What are the causal attributions of achievement outcomes in computer programming made by business computing students?

The first goal of this study was to determine the causal attributions held by 45 undergraduate business computing participants from a computer science department to explain their achievement outcomes in the 'Computer Programming 1' (CP1) course (see Table 4.8, p.117 and Table 4.9, p.119). This goal is deemed important to practitioners by many authors (Alderman 2008, p.40) especially that it focuses on undergraduate students (Phelps and Ellis 2002, p.517).

Number of causal attributions made by participant

Each participant made at least one causal attribution. Ten participants made two causal attributions (see Chart 4.3, p.107). This is in tune with other research that reported people giving a combination of reasons for their success and failure (Vispoel and Austin 1995, p.400; Dresel et al. 2005, p.4). In contrast with other research (Dresel et al. 2005, p.4), only participants who passed the course mentioned two reasons. Possibly the number of failing participants (9 participants) was not sufficient to show multiple causality. Had the sample size been larger, the results could have been more pronounced.

Causal attributions made in this study compared to previous research

The search for the causes of computer programming achievement outcomes of the 45 participants led to the identification of 11 causal attributions: 'lack of

study', 'appropriate learning strategy', 'lack of practice', 'inappropriate learning strategy', 'subject difficulty', 'lack of effort', 'appropriate teaching method', 'exam anxiety', 'cheating', 'lack of time', and 'unfair treatment' (see Table 4.8, p.117 and Table 4.9, p.119). Of the 11 causal attributions, only 'subject difficulty' and 'lack of effort' were amongst the four causes - 'ability', 'effort', 'task difficulty', and 'luck' - presented by the original model and subsequent research as the most responsible for achievement outcome (Bornholt and Möller 2003, p.221; Seifert 2004, p.138; Williams et al. 2004, p.19). 'Ability' and 'luck' were not mentioned by any participant in this study (see Appendix E). The reason for not citing 'ability' could be that the subject-matter under focus was not mathematics (Williams et al. 2004, p.20), which is the subject of many studies on attribution theory in education (Lloyd et al. 2005, p.386). Not citing 'luck' is most probably related to the type of exams that are conducted in a computer lab using the development tool itself to build a software solution. No multiple choice or true/false questions were included. 'Luck' was not cited in a foreign language study either (Williams et al. 2004, p.26).

Although 'appropriate learning strategy', 'inappropriate learning strategy', and 'appropriate teaching method' were not amongst the most cited causal attributions (Alderman 2008, p.29), they were among the findings of some research (Child 1997, p.69). At the first glance, 'lack of study' and 'lack of practice' seem to overlap with 'effort'. However, the term 'effort' might have different meanings in different cultures (Hufton et al. 2002, p.72; Williams and Clark 2004, p.237; Elliot and Dweck 2005, p.498). In this study, many students said they have made physical and mental efforts with adequate amounts by practicing on the computer and by memorizing syntax and code. The way those participants worked for the course matches the way Elliott et al. (2005) perceived effort: 'a construct with both cognitive and behavioural components' (p.102). For those students, it was their learning strategy that was wrong (see Extract 4.3, p.108). Thus, with the same effort and an appropriate learning strategy they could have achieved better (see Extract 4.4, p.109). According to the literature (see

p.57-9), with proper help those students could have changed to an effective learning strategy. The remaining causal attributions in this study 'exam anxiety', 'cheating', 'lack of time', and 'unfair treatment' were not cited by previous research. The previous findings are the rewards of avoiding the usage of a predetermined list of causal attributions collected from previous research or the use of hypothetical scenarios (Munton et al. 1999, p.66) as was mentioned in the Introduction (see p.5). Other research recommended avoiding the use of hypothetical scenarios because they lead to contradictory findings (Bempechat et al. 1996, p.58). Causal attributions may not be the same in different subjects and contexts (Williams et al. 2004, p.26).

The wide range of reported causal attributions (11) is due to the qualitative nature of this study that was based primarily on an open-format semi-structured interview. In another study, 29 causes were cited by a sample of 25 students in Bahrain where the subject was English (Williams et al. 2004, p.20). Uncovering causal attributions related to computer programming using interview is a major contribution to research (see pp.5-6). In other research, subjects are either provided with a questionnaire that forces a set of causal attributions possibly obtained from previous research (Birenbaum and Kraemer 1995, p.347; Bornholt and Möller 2003, p.221) or from the original model (Lim 2007, p.5), or presented with hypothetical scenarios where participants are asked to cite a major cause for their achievement outcome (Graham 1997, p.25; Phelps and Ellis 2002, p.518). One of the main strengths of this study lies in avoiding those two routes because they do not rely on experiences that have been lived.

Causal attributions tend to be domain specific

While citing the causes of their achievement outcomes, 36 participants expressed their belief that practice is essential in learning computer programming. Those participants belonged to all achievement outcome groups without exception (see Table 5.1 below and Extracts 4.5-4.8, pp.118-9). This finding supports to some extent some writers' belief that causal attributions are domain specific (Vispoel

and Austin 1995, p.391; Bornholt and Möller 2003, p.218; Williams and Clark 2004, p.237).

Table 5.1: Distribution of Participants Who Cited Practice by Achievement Level

	Number of Participants		
Achievement Level	**Cited Practice**	**Didn't Cite Practice**	**Total**
High	8	1	9
Good	8	1	9
Satisfactory	7	2	9
Passing	7	2	9
Low	6	3	9
Total	**36**	**9**	**45**

All high achievers cited 'appropriate learning strategy'

The group of high achievers did not attribute their achievement outcomes to ability which is thought to have strengthened their self-worth most (Elliott et al. 2005, p.23), but to 'appropriate learning strategy'. All of them attributed their achievement outcome to 'appropriate learning strategy' (see Table 4.30, p.146). Possibly, knowing how to learn computer programming and engaging successfully in implementing that knowledge strengthen self-worth and motivate students to learn similar tasks (Hufton et al. 2002, p.68). Teachers may contribute to this by giving recognition to students who are in the process of implementing an 'appropriate learning strategy' while the course is in progress (Petri and Govern 2004, p.337). Furthermore, some authors advise teachers to encourage students with helpless attribution patterns to use an 'appropriate learning strategy' (Elliot and Dweck 2005, p.305). In fact, 'strategy' was cited as a success attribution by several studies (William et al. 2004, p.26; Lloyd et al. 2005, pp.400-2). Even more, 'learning strategies' was reported by other research as one of the most important causal attributions (Alderman 2008, p.29).

Causal attributions classified by success and failure

Previous research distinguished between success and failure attributions (Lloyd et al. 2005, pp.400-2). In this study, 'lack of study' (see Table 4.19, p.136), 'lack of practice' (see Table 4.21, p.139), and 'inappropriate learning strategy' (see Table 4.22, p.140) were causes associated with both success and failure. These three causes were cited by participants from all achievement levels except the group of high achievers (see Table 4.11, p.121). The distribution of participants amongst the achievement levels B, C, D, and F for every causal attribution of these three causes was almost equal (see Table 4.11, p.121). Had there been more participants in the sample, this finding might have been different. In this study, 'appropriate learning strategy' was the only causal attribution associated with success and not with failure (see Table 4.11, p.121). However, participants from the D level did not mention it (see Table 4.11, p.121). Probably, the sample size had an effect on this finding too. 'Subject difficulty' and 'lack of effort' were causes associated only with failure (see Table 4.11, p.121). This finding is in agreement with previous research which showed that 'task difficulty', 'lack of effort' were very important reasons for failure (Bornholt and Möller 2003, p.224). This finding was discussed in the previous paragraph. 'Lack of study' was the most cited cause for failure. Also, it was the second most highly cited success attribution after 'appropriate learning strategy'. A previous study mentioned the cause 'studying', but only in reference to the time spent in studying for an exam, which ranked 11th on a 12-item rating scale (Williams and Clark 2004, p.237). Most probably, 'lack of study' is specific to the context of the study, not only because it did not appear in previous research, but because many colleagues have been complaining about its spread at MSU.

Classification of causal attributions as key and associate causes

Of the 11 causal attributions in this study, six were mentioned as lone causes and in 10 cases jointly with another cause (see Table 4.10, p.120). Consequently, those six causes were named key causes (see Table 4.8, p.117). The other causes were named associate causes because they never appeared as sole causes, but

always with key causes. Table 4.9 shows associate causes (see Table 4.9, p.119). The five associate causes will be discussed later in this section. 'Lack of study', the leading causal attribution (see Table 4.8, p.117), was made by participants from all achievement levels except the group of high achievers (see Table 4.11, p.121). The second and third most highly cited causal attributions were 'appropriate learning strategy' and 'lack of practice' respectively (see Table 4.8, p.117). These findings were inconsistent with previous research that showed that 'ability' and 'effort' were the dominant causal attributions (see pp.30-1) mainly because in previous research respondents were given a predetermined list of causal attributions to choose from or to rank (Bornholt and Möller 2003, p.217). 'Inappropriate learning strategy' was reported by previous research (Lepper and Henderlong 2000, p.292; Bentham 2002, p.131) and sometimes under the rubric 'strategy' (Lloyd et al. 2005, pp.400-2). 'Subject difficulty' and 'lack of effort' were reported by previous research as 'task difficulty' and 'effort' (p.30), respectively.

Previous research on attribution theory mainly employed a questionnaire as a primary data-collection instrument (Birenbaum and Kraemer 1995, p.347; Bornholt and Möller 2003, p.221) which did not offer respondents the chance to freely cite more than one cause, under the pretext of simplicity (Weiner 2000, p.4). In this study, five of the 11 causal attributions were mentioned by participants jointly with the first 3 leading key causes (see Table 4.10, p.120). Those five causes were named associate causes because they were not mentioned as lone causes. Previous research on attribution theory did not make this distinction between key causes and associate causes because participants were not given the chance to talk about their perceptions of achievement outcomes in open-format semi-structured interviews. There was only one leading associate cause 'appropriate teaching method' (see Table 4.9, p.119). The latter cause is specific to the course under focus. Had another teacher taught this course, the result would have been different. Nevertheless, high achievers mentioned it for some reason which will be discussed in the next paragraph. 'Appropriate teaching

method' was reported by previous research (Child 1997, p.69). The other associate causes 'exam anxiety', 'cheating', 'lack of time', and 'unfair treatment' were mentioned by just one participant each (see Table 4.9, p.119).

Three associate causes were related to other people, the self, and the environment (see Table 5.2 below). Thus, the locus of causality for associate causes was external (see Table 4.25, p.141 and Tables 4.27-4.29, pp.143-4), except for 'exam anxiety' which was internal (see Table 4.26, p.143). Citing an external factor affecting one's life makes sense because a person cannot live completely detached from other people or the milieu. In fact, this leaves the question of why the other participants did not give more than one cause unanswered for the study.

Table 5.2: Causal Attributions Made by Participants – Associate Causes

Associate Causal attribution	Attributed To	Number of Participants
Appropriate teaching method	teacher	6
Exam anxiety	self	1
Cheating	classmate	1
Lack of time	environment	1
Unfair treatment	teacher	1

Only 'appropriate teaching method' was supportive to achievement. The remaining associate causes were obstructive to achievement. One participant of the passing group cited being treated unfairly by the teacher. He blamed his teacher for getting a lower grade than expected. Of the nine high achievers, 6 participants gave their teacher credit for their successes by citing 'appropriate teaching method' as an associate cause. While some research showed the importance of teachers in success outcomes (Williams and Clark 2004, p.237), other research showed that it was low in importance (Bornholt and Möller 2003, p.227). In contrast with other studies (Williams et al. 2004, p.26), failing participants did not blame their teacher for their failures. Among the low

achievers group, only one out of 9 participants attributed failure to an external factor, the others felt responsible for their failures which is inconsistent with some research (Johnston and Lee, p.323). This finding is labeled altruism effect by Vispoel and Austin (1995 p.389). Vispoel and Austin argue that 'if students were truly self-serving individuals, with ego-protection or ego-enhancement in mind, they would be expected to blame others for failure and give them little credit for success' (1995 p.389). This suggests that participants were honest in their interpretations of their achievement outcomes. Self-serving bias was not present in this study which is not congruent with previous research (see p.55).

Supportive versus obstructive key causes

The classification of a cause as supportive or obstructive did not appear in the literature before this study most probably because previous research focused just on the underlying causes of causal attributions which were believed to be the only predictors of future achievement outcome (Weiner 2006, p.9). Of the 45 participants, 32 (71.1%) gave an obstructive key cause compared to 13 (28.9%) who gave a supportive key cause 'appropriate learning strategy'. Two groups were identified within obstructive key causes. The first one is related to 26 participants who attributed their achievement outcome to 'lack of study', 'lack of practice', and 'lack of effort'. They formed a high percentage 57.8% which shows the seriousness of lack of academic motivation prevalent within the group of participants. The second group which cited 'inappropriate learning strategy' and 'subject difficulty', 15.6% of the total participants, reveals the presence of some students who were for some time motivated to learn computer programming (see Extracts 4.3-4.4, pp.117-8). There is a better chance for students who cite 'inappropriate learning strategy' and believe that it is unstable to remedy the situation and improve their achievement outcome than students who cite 'subject difficulty' and believe that it is stable (Lepper and Henderlong 2000, p.292).

Supportive versus obstructive associate causes

Ten students gave two causes to justify their grade (see Table 4.10, p.120, column 'Key Cause and Associate Cause'). Three different trends were identified (see Table 4.13, p.125, column 'Category'). The first one is where the two causes were both obstructive and it included three instances. In these instances, the associate causes, 'cheating', 'lack of time', and 'unfair treatment' worked with the key causes 'lack of study' and 'lack of practice' in the same direction obstructing a better achievement outcome, but not to the extent of failing the course. In fact, achievement outcome was ascribed to a cause whose source is either the self, a significant other (teacher, classmate), or situational ('lack of time') (see Table 5.2, p.195). The classification of causes as supportive versus obstructive shows that the specific content of causal attributions plays a role in instigating or prohibiting motivation. This finding contradicts the proposition that motivation is determined only by the underlying properties of causal attributions (see p.33) (Weiner 1995, p.251; Phelps and Ellis 2002, p.516; Dresel et al. 2005, p.2). Perceiving a supportive causal attribution as unstable may decrease motivation, while perceiving an obstructive causal attribution as unstable may increase motivation.

Causal Attributions and female participants

The low achievers group did not include any females (see pp.99-100). In other groups, causal attributions were similar for females and males (see Table 4.15, p.127), which is in agreement with previous research where English and Mathematics were the subjects under focus (Bornholt and Möller 2003, p.217). Female participants cited 'lack of study', 'appropriate learning strategy', and 'inappropriate learning strategy' (see Table 4.15, p.127). Still, it was not viable to compare the ranking of causal attributions by gender because the sample was small and females formed just 13.3% of it (see Table 4.1, p.95).

Research Question # 2

How did business computing students come to identify the reasons that caused their achievement?

Instigation of attributional processes

A distinguishing factor of this research is its reliance on participants' perceptions of their achievement outcomes on a past event that they have experienced moment by moment for a semester instead of building on a hypothetical event of success or failure (see p.5). Students are asked to give causal attributions, a step that is criticised by some authors on the ground that the act of asking triggers causal search which would not have occurred otherwise (Försterling 2001, p.13). However, alternatives such as asking about another topic that might hopefully lead to information pertaining to the one under investigation are worse because they would have been time and energy consuming and most important they would have jeopardised the trustworthiness of the research since the study's purpose should be explicitly stated in the letter of informed consent. Identifying whether the participants spontaneously made causal attributions at the interview time or after receiving the course's letter grade was not possible. Thus, this study can neither support nor refute the critique reported by Försterling. The critique talks about forcing participants to make attributions in research that provides them with hypothetical information (Försterling 2001, p.13) which does not apply here. In this study, one expects students (33 participants) who expected their achievement outcome on a course given over a semester to have gone through causal search before the study.

Nevertheless, causal attributions can be grouped based on the course enrolment timeline. This classifies participants from the fall 2001 to the spring 2007 semesters into naturally occurring groups (see Table 4.7, p.108). Table 4.7 did not show any major differences in causal attributions made by the various groups except for the students who changed their academic programme. Those students'

causal attributions did not include any of the first 3 leading key causes (see Table 4.7, column 'Changed Academic Programme', p.108). This provides evidence about the possibility of changing academic programme when a student fails the course because he does not know how to study computer programming (see p.138 and Table 4.22, p.140), finds the subject difficult (see p.138 and Table 4.23, p.140) or does not make any effort to study (see p.138 and Table 4.24, p.141). This is a very important finding that requires further in-depth investigation with a larger sample. In addition, it requires fast involvement of qualified people to offer those students proper guidance before their problems aggravate. The way those three students perceived the underlying properties of the cited causes played a major role in the decisions they took (Weiner 2006, p.9). More light will be shed on this issue under research question # 6 in this chapter.

The 14 participants whose CP1 and CP2 courses were in progress at interview time did not make causal attributions different from participants who already had completed those courses (see Table 4.7, p.108). This shows that within the time frame of the fall 2001 to the spring 2007 semesters causal attributions were the same. Furthermore, all participants engaged in causal search whether their achievement outcome was expected (33 participants) or not (12 participants) (see Table 4.7, p.108, and Table 4.17, p.120). This finding is in agreement with previous research (Försterling 2001, p.15). However, not all participants were successful in determining the cause. Extract 4.9, p.120, is for a student who did not expect his achievement outcome and engaged in a causal search after receiving a failing grade, but did not succeed in finding the cause which kept him in a state of surprise for some time. Previous research identified similar cases with low achievers (Alderman 2008, p.32).

There were 12 participants who did not expect their achievement outcome (see Table 4.17, p.120). Aside from participant 13, the remaining participants did not expect the outcome either because their grade was lower (6 participants) which makes the grade a negative outcome, or because it was higher (5 participants)

which makes the grade an important outcome. Making causal attributions when events are negative, unexpected, or important is in agreement with previous research (see p.27).

Direct and indirect causal antecedents

In congruence with the literature (Alderman 2008, pp.32-4), common themes of causal antecedents were identified and were categorized as either direct or indirect. Most causal antecedents that guided the making of causal attributions in this study were direct except for 'lack of guidance', 'good teaching', and 'democracy' which are not related to the self, but to other people (see Table 4.18, p.130). The dominance of 'carelessness' and 'work' in this context was not surprising. 'Carelessness' was a prevalent mood that many teachers had been criticising in our institution (see Extract 4.10, p.122). The combined percentages of 'carelessness' and 'laziness' amount to 36.6% of the sample, an alarming figure. About 30% of the participants revealed that they work to pay their tuition fees. This is evidence that the prevalent economic problems in Lebanon were influencing students' motivation for learning. This evidence contradicts Rahi's finding which showed that the social and economic aspects did not influence students' achievement at the same university (Rahi 2005, pp.272-3).

Many authors have shed light on the importance of past performance as a causal antecedent (Seifert 2004, p.138). In this study, 'unfamiliarity with programming' was cited by 9 students (see Table 4.18, p.130). Citing unfamiliarity with the subject-matter is consistent with some research (Griffin 2006, p.10). These participants did not study programming before joining the business computing programme. The absence of a past history in learning computer programming had an influence on their formation of causal attributions.

The citation of 'performance of others' was consistent with previous research (Weiner 2000, p.4) where participants attributed achievement outcome to the self when others have succeeded and they have failed (see Extract 4.11, p.122).

The causal antecedents: 'unfamiliarity with programming', 'familiarity with programming', 'liking programming', 'indifferent to programming' together amounted to 34.4% of the participants' cohort (see Table 4.18, p.130). This evidence shows that personal feelings about a subject play an important role in forming causal attributions. To increase business computing students' success in computer programming courses, the computer science department may want to offer awareness programmes during the first semester at the University to deepen the students' belief in the future of programming (Graunke and Woosley 2005, p.6).

Except for two students who mentioned lack of guidance and another who said he was sick and got help from his parents, affective communications from other people were not present. Although infrequent, the causal antecedent lack of guidance shows the importance of running orientation sessions specific to business computing students beside the general orientation sessions run by the students' affairs office every semester.

Research Question # 3

What are the underlying properties of causal attributions of business computing students' achievement outcomes in computer programming with regard to causal dimensions: locus of causality, stability and controllability?

Fourth dimension

In 1979, Weiner (p.7) suggested the presence of a fourth causal dimension *globality* beside l*ocus of causality*, *stability*, and *controllability*. Globality refers to whether the causal attribution has influenced all courses taken simultaneously in a particular semester or just the course under focus. Later, Weiner (2000, p.4) rejected his proposition and affirmed that there were only three dimensions.

Despite his affirmation, researchers kept proposing the investigation of globality as a causal dimension candidate (Phelps and Ellis 2002, p.516; Dresel et al. 2005, p.11; Elliot and Dweck 2005, p.191). One of the studies about attribution theory excluded controllability and included globality (Mitchell and Hirom 2002, p.2). Although the sample is small, this study provides evidence that globality is a fourth dimension of causal attributions in this achievement context (see Extract 4.12, p.124).

Table 4.19, p.136, shows that the causal attribution 'lack of study' varied the lowest on the globality dimension amongst the other causal dimensions. Only 2 out of 14 students perceived it as specific to CP1. Those two students, i.e. participants 12 and 35, perceived the cause as controllable which enables them to make improvements in learning subsequent computer programming courses. However, participant 12 who perceived the cause as stable received a lower grade, while participant 35 who perceived it as unstable received a higher grade (see Table 4.19, p.136). 'Lack of study' influenced the 12 other participants in all their courses the semester they took CP1 as they have revealed in their interviews. This is reflected in the column labelled *Globality* where the word *global* appears 12 times (see Table 4.19, p.136). The globality dimension revealed that 'lack of study' affected much more participants in all subject areas taken simultaneously with CP1 than just CP1 (Phelps and Ellis 2002, p.516).

Not only 'lack of study', but 'inappropriate learning strategy' tended to be more global than specific (see Table 4.22, p.140). Most students who cited those causes said that they influenced all their courses. 'Appropriate teaching method' tended to be specific (see Table 4.25, p.141). With 'appropriate learning strategy' and 'lack of practice' there was no clear inclination to being global or specific. Students who cited 'appropriate learning strategy' and perceived it as global were in control of all their courses, while those who perceived it as specific were in control of just computer programming. The globality dimension offers attribution retraining programmes additional information about the type of problem at hand

which helps in providing treatments accordingly. This fourth dimension raises the possible combinations of causal properties from 8 (see Table 2.2, p.39) to 16 (2 x 2 x 2 x 2).

Causal dimensions as perceived by participants

The 14 participants who cited 'lack of study' perceived it in 9 different combinations of causal properties (see Table 4.19, p.136) out of 16 possible combinations. Twelve of them revealed that they did not study for CP1 and for the other courses that semester. 'Lack of study' tends to be more global than specific.

Four participants who perceived 'lack of study' as uncontrollable perceived it as global too (see Table 4.19, p.136). With this knowledge, a cause that is perceived as global may be controllable by some students and uncontrollable by others, for example see participant 1 in Table 4.19. The same applies on causal attributions perceived as specific, for examples see participants 4 and 7, Table 4.21, p.139. The same applies on stability and locus of causality.

All students who attributed their achievement to 'lack of study' were not high achievers and the majority of them perceived it as global. Thus, it is highly plausible that a non-high achiever who is not studying for CP1 is also not studying for other subjects.

The 13 participants who cited 'appropriate learning strategy' perceived it in 2 different combinations of causal properties out of 16 possible combinations (see Table 4.20, p.128). 'Appropriate learning strategy' was perceived internal, stable, and controllable by all 13 participants who cited it as a causal attribution irrespective of the achievement level (see Table 4.20, p.128). According to literature and previous research (see pp.37-8), people may agree or disagree on the location of a cause in the causal space. Although there was total agreement on those dimensions, 6 perceived 'appropriate learning strategy' as global, while 7

perceived it as specific (see Table 4.20, p.128). This shows the importance of globality.

The 10 participants who cited 'lack of practice' perceived it in 7 different combinations of causal properties out of 16 possible combinations (see Table 4.21, p.139). Out of the 10 participants, 9 perceived it as internal. This shows that those participants held themselves accountable. In a study conducted by Latu (2004, p.348), results showed that almost all students attributed their achievement to external factors. Further, while 6 perceived 'lack of practice' as stable, 4 perceived it as unstable (see Table 4.21, p.139).

All 5 students who cited 'inappropriate learning strategy' perceived it as internal (see Table 4.22, p.140). They perceived it differently on the stability, controllability, and globality dimensions. 'Subject difficulty' and 'lack of effort' were perceived as internal, stable, controllable, and global by the 3 participants who cited them (see Table 4.23, p.140 and Table 4.24, p.141). Some research showed that 'subject difficulty' is perceived as stable (Alderman 2008, p.31), and 'lack of effort' was perceived as internal, stable, and global (Phelps and Ellis 2002, p.519). All 5 students who cited 'appropriate teaching method' perceived it as external, stable, and specific (see Table 4.25, p.141). On the controllability dimension, 4 out of 5 perceived this cause as controllable although it was the teacher who was able to bring about change to it. This finding is in disagreement with some authors who believe that a causal attribution is perceived as controllable when the perceiver personally can bring about change (Försterling 2001, p.157). Other research showed that external attributions for negative outcomes can be controllable (Griffin 2006, p.10). Only one participant out of 5 perceived the cause on the controllability dimension according to Försterling's point of view. A study by Dresel et al. (2005, p.10) showed that 87 students perceived their causal attributions differently on every causal dimension.

Congruency of properties

According to attribution theory, causal attributions are classified based on their perceived causal properties (Försterling 2001, p.110; Latu 2004, p.344). In this study, different causal attributions were described identically over the 4 causal dimensions by different students. For instance, participants 3 and 40 from the satisfactory achievers group (see Table 4.32, p.148) and participants 5, 11, and 14 from the low achievers group (see Table 4.34, p.151) perceived both 'lack of practice' and 'lack of study' as internal, stable, uncontrollable, and global. Previous research showed that people who perceive negative outcomes as internal, stable, and global become helpless and depressed (Malle 2004, pp.20-1). Believing that an achievement outcome is due to an uncontrollable cause may lead to helplessness too (Martin 2002, p.37). In this study, all five participants cited in this paragraph failed the next course in the sequence.

Another common causal style emerged from the data where the high achievers participants 13, 30, and 36, the good achievers participants 6, 15, and 44, the satisfactory achiever participant 42, the passing achievers, 22, and 26, and the low achievers participants 8, 23, 16 perceived 'appropriate learning strategy', 'lack of practice', 'lack of study', 'inappropriate learning strategy', 'subject difficulty', and 'lack of effort' as internal, stable, controllable, and global (see Tables 4.30 to 4.34, pp.146-51). Of these students, three failed CP2 which is consistent with the findings of previous research reported by Malle (2004, pp.20-1). Possibly those three students were not able to control the internal and stable cause as they have anticipated.

The perception of causal attributions as internal prevailed

Consistent with other research (Williams et al. 2004, p.27), the majority of participants, 39 participants out of 45 (86.7%), took personal responsibility for their achievement outcomes. All six female students perceived their causal attributions as internal. This finding supports previous research which has shown that females attribute their success and failure to internal causes (Legette 1998,

p.109). Also, the positive role of the perception of causal attributions as internal by those participants embodied in bringing about motivation in this study is consistent with other research (Phelps and Ellis 2002, p.521).

Research Question # 4

How does the stability dimension of causes attributed to earlier achievement outcome influence motivation and relate to students' expectations of future success?

The stability dimension and supportive and obstructive causes

It is worth mentioning that for the group of good achievers those who attributed their achievement outcome to an obstructive causal attribution and perceived it as unstable, or to a supportive causal attribution and perceived it as stable, felt optimistic and motivated to learn, and improved their achievement outcome (see p.158). This finding is consistent with the literature (Graham and Weiner 1996, p.71).

What is noticeable for the group of satisfactory achievers is that while 'lack of study' and 'lack of practice' were both obstructive causes, the former was perceived as unstable and the latter was perceived as stable (see p.155 and Table 4.38, p.159). In addition, the perception of an obstructive cause as stable by satisfactory achievers triggered in them optimism and motivation, and expectation of future success. A possible explanation is that they relied on their experience with the amount of practice they invested in CP1 and anticipated similar situation for CP2. Consequently, they enrolled in CP2, but two of them failed while the third obtained a lower achievement outcome (see Table 4.38, p.159). The findings in this paragraph require further investigation.

Unstable causal attributions

Furthermore, out of 15 participants who perceived their obstructive causal attributions as unstable (see Table 4.41, p.163), 13 passed CP1 for the second time or CP2, one passing achiever failed, and one satisfactory achiever did not take CP2. By attributing their success or failure to an unstable obstructive cause, those 13 students motivated themselves and actually passed the second course in the sequence, which is consistent with the literature (see p.45).

Prevalent positive outlook

Only 4 out of 45 participants did not expect to pass CP2 or CP1 (see Table 4.41, *Future Success Not Expected* column, p.154). Thus, most participants shared a positive look towards future success. Further, out of 41 students who expected to pass the next programming course (see Table 4.41, *Future Success Expected* column, p.154) ten failed it. Thus, there is a weak association between the expectancy dimension of the Expectancy-Value motivation model and the actual achievement outcomes.

The stability dimension and expectation of future success

The stability dimension of attribution theory and the expectancy dimension of the Expectancy-Value motivation model mapped identically (see p.157), very well (see p.158), well (see p.159), and poorly (see p.160 and p.162) within the groups of high, good, satisfactory, and passing and low achievers respectively. This wide variation in the present context does not relate stability to participants' expectations for future success as closely as Weiner (2000, p.5) proposed in his model (Försterling 2001, p.113; Latu 2004, p.344).

While neither the stability dimension nor the felt emotions, optimism and motivation, did map well into the expectancy determinant of motivation, stability mapped very well with the actual outcomes for failing achievers (see p.161).

Research Question # 5

How do the locus of causality and controllability dimensions influence motivation and relate to the value determinant of motivation?

The locus of causality and controllability dimensions, and motivation

Based on the literature (see p.44), two emotions were studied in relation to locus of causality: pride and self-esteem and 5 emotions in relation to controllability: guilt, anger, pity, shame, and gratitude (see p.46). Many achievers were motivated by emotional consequences of locus of causality, controllability, or both (see Tables 4.42-6, pp.166-71) which is consistent with the literature (Seifert 2004, p.140).

Self-confidence appeared as a third emotion related to locus of causality

In addition to the emotions listed above, self-confidence was cited by 12 participants in relation to locus of causality (see Lines 123-9, 147-9, and 156-7 in Appendix E). Since self-confidence started to emerge after conducting several interviews, it was not pursued to the end, but it is worth investigation in future research, especially that it was cited by students in a previous study that investigated computer anxiety (Phelps and Ellis 2002, p.520).

The locus of causality and controllability dimensions and the value determinant of motivation

The locus of causality and controllability dimensions of attribution theory and the value dimension of the Expectancy-Value motivation model mapped very well within the groups of high, good, and satisfactory achievers as suggested by the literature (Anderson and Arnoult 1985, p.248; Weiner 2000, p.5). However, for passing and low achievers it mapped satisfactorily and poorly respectively which is inconsistent with the literature (Weiner 2000, p.5).

Locus of causality and related emotions

The findings show that several students, from all achievement levels except high achievers, had neither pride nor self-esteem changed due to perceiving a cause as internal (see Tables 4.43-4, pp.167-8 and Table 4.46, p.171). This finding weakens the proposition that each dimension has psychological consequences (Graham and Weiner 1996, p.71) especially if research does not find emotions related to the locus of causality dimension other than pride and self-esteem.

Perceiving a cause as external triggered emotional consequences in some participants (see Tables 4.44-6, pp.168-71) which is inconsistent with the literature (Seifert 2004, p.140), while it did not with others (see Tables 4.45-6, pp.170-1).

Decrease in pride and self-esteem bring about motivation too

Of the 27 students who felt a change in their pride, high and good achievers felt an increase in their pride except for one good achiever, while satisfactory, passing, and low achievers felt a decrease in pride due to their achievement outcome. Having students motivated by a decrease in pride or self-esteem is inconsistent with the literature (Weiner 2000, p.3). Nevertheless, in this study, a decrease in pride and self-esteem of satisfactory achievers triggered motivation. This keeps the proposition by Graham and Weiner (1996) about internal attributions to success being positive motivators valid (p.71). This finding shows the importance of dividing the students who succeeded in the course into more than one group.

Emotions did not necessarily bring about motivation

Feelings of anger and pity may prohibit motivation, see participant 21, Table 4.44, p.168. Unlike the others, he did not value the course and changed his major to business. In addition, one student had feelings of guilt and pity, but they did not bring about motivation, see participant 6, Table 4.43, p.167.

More emotions do not bring about better achievement

Further, being motivated by both dimensions did not necessarily lead to better achievement outcome (see Participant 4, Table 4.43, p.167). The lower the achievement level, the more emotions were felt which in turn triggered more motivation according to what the participants revealed in their interviews (see the Motivation columns in Tables 4.42-6, pp.166-71). However, more emotions did not lead to better achievement outcome (see the last columns in Tables 4.42-6, pp.166-71).

Expectancy-Value motivation model is challenged

Participants 41 and 22, Table 4.45, p.170, did not value CP1, but were motivated by one feeling related to locus of causality and two or three feelings related to controllability. They passed CP2. This finding contradicts the Expectancy-Value motivation model stating that the absence of one of its determinants, in this case the course is not valued, prohibits motivation. In addition, it supports the non-preserving of the multiplicative formula of that model by the attribution theory (see p.43).

Research Question # 6

What actions will students take on computer programming courses in the future from an attributional perspective?

Effect of interviews on achievement outcome

The findings of Table 5.3 do not show whether the interviews improved or worsened the situation for the 13 participants whose CP2 course was in progress and for the 3 participants who were repeating CP1.

Table 5.3 Achievement Outcome of Participants Where CP2 for Non-Low Achievers and CP1 for Low Achievers Was in Progress

Previous Achievement Outcome / New Achievement Outcome	A	B	C	D	F
High	1	2	1		
Good	1				
Satisfactory				2	3
Passing		1			2
Low				2	1

For abbreviations see legend at the start of the thesis

Of the 3 participants who were repeating CP1, 2 passed it, while 1 failed. It should be noted though that of the 13 non-low achievers, 10 participants achieved lower than before where half of them failed specifically from the satisfactory and passing groups. Three of the students who failed perceived their obstructive causal attributions 'lack of practice' and 'inappropriate learning strategy' as stable. The fourth student perceived 'appropriate learning strategy' as stable and controllable, but 'exam anxiety' as unstable and uncontrollable. The failure of the fifth student, participant 28, was surprising (Latu 2004, p.344) since he perceived 'lack of practice' as internal, unstable, controllable, and specific. He was motivated, expected to pass CP2, and valued CP1. Below is an extract of his interview:

Extract 5.1 [Participant 28]

R: It was a motivator for me / I decided to make more practice / since day one of the second course, I practice at home everything I take in class / I am looking at programs developed by senior students to have an idea of the concepts before attending my classes to understand them well / the final exam of CSC 216 decreased from the importance of the problem that occurred in my first exam / I

am not scared anymore from computer exams / I have practised enough to figure out the source of errors in my programs

The interview did not have a major effect on the course of events of interviewees whose programming course was in progress. At most, the interview could be considered a preparatory step towards the diagnosis, planning and implementation of an appropriate attribution retraining programme.

Prediction of future success and failure

The emphasis on the CP1 course had a noticeable advantage of being the introductory level course in a sequence of computer programming courses. This helped in supporting the analysis of each case by looking at the outcome of the second course in the sequence. The consequences of attributional processes may be predicted, without firm confirmation though, after determining the location of a cause within the three-dimensional causal space by attributers themselves. This is best depicted by the group of high achievers who not only made the same causal attribution for their achievement outcome and perceived it at the same location in the three-dimensional causal space (see Table 4.30, p.146), but they shared the same emerging feelings of optimism (see Table 4.36, p.157), pride, self-esteem, and gratitude (see Table 4.42, p.166) from which motivation to learn a similar course was triggered. Five of them cited 'appropriate teaching method' as a second cause. Despite all this commonality, only four of them maintained the same achievement level CP2 (see Chart 4.5, p.164). A possible explanation is that although those participants perceived their causal attribution as controllable, it is plausible that circumstances did not help them to be in control; especially that 'appropriate learning strategy' includes several components. Perhaps, the intensity of the causal attributions-related emotions was a contributing factor to the variation in achievement outcomes. That is, a variation in the intensity of felt emotions led to a variation in volume and quality of engagement in implementing what they cited as an 'appropriate learning strategy'.

Location within the causal space that helps in predicting improvement

The findings of Table 4.48, p.174, show that most students who perceived their obstructive causal attribution as internal or external, unstable, and controllable improved their achievement outcome in CP2. Some writers support this finding, but without mention to the external factor (Latu 2004, p.344). Participants perceived 'lack of study', 'lack of practice', and 'inappropriate learning strategy' as unstable which made them optimistic of improving their achievement outcome in the future and motivated to study in ways that bring about change to their obstructive causal attribution. Those participants felt one, more than one, or all of the following guilt, anger, pity, shame, or gratitude because they perceived their causal attribution as controllable. Those emotions motivated them to overcome the challenges of CP2 to the extent of getting a higher achievement outcome than that of CP1. Previous research showed that students who 'believe that their academic achievement depends on controllable factors are more motivated and generally achieve at higher levels than when they feel a lack of control over their own learning' (Elliot and Dweck 2005, p.305).

The case of the passing student who failed CP2 conflicts with this understanding. It was covered earlier under this research question, see extract 5.1 [Participant 28], p.191. However, perceiving 'lack of practice' with those properties makes his attributional pattern adaptive to change, possibly through an attribution retraining programme (see pp.57-9).

Location within the causal space that helps in predicting failure

The findings of Table 4.50, p.176, show that students who perceived their obstructive causal attributions as internal or external, stable, and uncontrollable lowered their achievement outcome (1 participant), failed CP2 (2 participants), or repeated CP1 (4 participants), a finding that is consistent with the literature (Seifert 2004, p.140; Elliot and Dweck 2005, p.517; Lim 2007, p.4; Alderman 2008, p.38). Five out of six students who failed in this group perceived their causal attribution as internal, stable, uncontrollable, and global. This is a

pessimistic attributional style (see pp.52-3). Those students feel they have less hope to alter the course of failure (Myers 2000, p.300). Seifert (2004, p.140) believes that failure attributed to that combination of causal properties is an indication of inability. Some of those students seemed to be depressed people.

Location within the causal space that helps in predicting success

The findings of Table 4.50, p.176, show that 23 participants perceived their causal attribution as internal or external, stable, and controllable.

Only one out of 13 participants who attributed their success to 'appropriate learning strategy', a supportive cause, unofficially withdrew from CP2 sometime before the exam. A student who unofficially withdraws from a course obtains a zero. Thus, it is considered a failure. That student was suffering from 'exam anxiety' that was perceived as internal, unstable, and controllable. Only one out of 7 participants who attributed their success to obstructive causes failed CP2. Two of the 3 low achievers failed CP1 again. Thus, 19 out of 23 participants in this category passed their course. The remaining four students can be helped using attribution retraining since they perceived their causal attribution as controllable.

The three students who perceived their causal attribution as internal, unstable, and uncontrollable passed their course. Thus, attribution theory can anticipate achievement outcomes in similar future computer programming courses.

Summary

Causal attributions of achievement outcomes in computer programming

The first research question successfully led to identifying the causal attributions of achievement outcomes in computer programming which was one of the major objectives of this study. Eleven causal attributions were revealed: 'lack of study',

‘appropriate learning strategy’, ‘lack of practice’, ‘inappropriate learning strategy’, ‘subject difficulty’, ‘lack of effort’, ‘appropriate teaching method’, ‘exam anxiety’, ‘cheating’, ‘lack of time’, and ‘unfair treatment’ (see Table 4.8, p.117 and Table 4.9, p.119). The two leading causal attributions were ‘lack of study’ and ‘appropriate learning strategy’ (see Table 4.8, p.117). ‘Appropriate learning strategy’, ‘inappropriate learning strategy’, and ‘appropriate teaching method’, were consistent with the findings of previous research (see p.190). ‘Subject difficulty’ and ‘lack of effort’ appeared in the original attribution model as well as ‘task difficulty’ and ‘effort’, but they were among the least cited in this context (see Table 4.8, p.117 and Table 4.9, p.119). ‘Ability’ and ‘luck’ appeared in the original model too (p.30), but they were absent in this context (see p.190). While the participants of this study did not cite ‘ability’ possibly because learning computer programming does not require high degree of competence, they did not cite ‘luck’ possibly due to the nature of the course’s computer exams (see p.190). ‘Effort’ was not cited by students because it was associated with the amount of work they have invested in the course which was believed to be appropriate as mentioned in some interviews. However, the invested effort did not follow an ‘appropriate learning strategy’ that led to success (see p.190). There were 36 students who said that practice is important to computer programming (see Table 5.1, p.192). Not citing causes classified as dominant by the original model and citing causes such as ‘lack of study’, ‘appropriate learning strategy’, and ‘lack of practice’ shows that causes are either context specific or domain specific (see p.191). Uncovering causal attributions of undergraduate students related to the context of the study and to computer programming was a major goal of this study (see p.6).

In addition to answering the research question, several classifications and key issues emerged that are important for future research. The open-format of the interview questions was a chance for some participants to give two causes (see p.194). Six of the 11 causal attributions were mentioned by participants as lone causes and in some cases jointly with a second cause such as ‘lack of study’ (see

Table 4.8, p.117 and Table 4.10, p.120). They were called key causal attributions. The remaining five causes were called associate causes because they were mentioned by participants jointly with key causes, not even once alone such as 'appropriate teaching method' (see Tables 4.9, p.110 and Table 4.10, p.120). Multiple causality in this context allowed classifying causal attributions as key causes or associate causes. All leading causal attributions were key causes. Some of those who cited key causes that ranked the lowest changed their academic programme. All associate causes were perceived as external related to other people, especially the teacher, except for 'exam anxiety' which was perceived as internal. All those who cited associate causes did not fail their computer programming course.

The findings showed that some causal attributions were associated with both success and failure such as 'lack of study', 'lack of practice', and 'inappropriate learning strategy' (see Table 4.11, p.121). This shows that negative causes do not associate with failure only. In addition, the distribution of participants amongst the achievement levels B, C, D, and F for 'lack of study', 'lack of practice', and 'inappropriate learning strategy' was almost equal (see Table 4.11, p.121). This finding requires further investigation. While 'appropriate learning strategy' was associated with just success, 'subject difficulty', and 'lack of effort' were associated with just failure. While 'appropriate learning strategy' was the most cited cause for success, 'lack of study' was the most cited cause for failure. It is what the students said in interviews that helped in uncovering this classification and not a predefined classification by the researcher. The findings in this paragraph and the previous one are direct gains of using open-format semi-structured interviews.

Further, the high achievers group was distinguished from other groups since all its members cited a common causal attribution 'appropriate learning strategy'. This finding shows the importance of selecting the sample based on more than two strata of achievement outcomes.

The self-serving bias was not present in this study (see p.152). While six high achievers gave their teacher credit for their successes by citing 'appropriate teaching method', one participant from the passing achievers group cited being treated unfairly by the teacher. Among the low achievers group, only one out of 9 participants attributed failure to an external factor (see p.196).

Also, causes were classified as obstructive such as 'lack of study' or supportive such as 'appropriate learning strategy' (see p.123-4). Students may perceive the underlying properties of obstructive and supportive causal identically the same, but their future achievement outcomes go in opposite directions (see Table 4.31, p.147). No one from the low achievers group cited the latter supportive cause (see p.122). In the group of students who cited two causes, three trends were identified (see Table 4.13, p.125). First, the key and associate causes were obstructive to achievement, but not to the extent of failing the course. Second, the key cause was supportive and the associate cause was obstructive, but not to the extent of failing the course. Third, both causes were supportive to learning where students reached high achievement. This type of classification depicted that the specific content of a causal attribution plays a role in instigating or prohibiting motivation. This finding contradicted the proposition that motivation is determined only by the underlying properties of causal attributions (Weiner 1995, p.251).

Two subgroups were identified within the group of participants who cited obstructive key causes. On one hand, the first subgroup which included 25 participants (see Table 4.8, p.117) who attributed their achievement outcome to 'lack of study', 'lack of practice', and 'lack of effort', showed the magnitude of the prevalent lack of sufficient academic motivation. On the other hand, the second group which included 7 participants (see Table 4.8, p.117) who cited 'inappropriate learning strategy' and 'subject difficulty', revealed the presence of some students who were trying to learn. Both groups needed help.

The sample did not include a female failure. Females who participated in the study did not cite causal attributions different from their male counterparts (see p.197 and Table 4.15, p.127). This section shows that the first research question fulfilled the first part of the second research objective which is related to identifying causal attributions (see p.7). The section below shows how the second part of the second research objective was answered.

Factors that instigate or guide attributional processes

The second research question revealed themes about participants' perceptions of their own achievement outcomes. These resulted from experiences that extended for one semester instead of relying on hypothetical event of success or failure as has been the case with many research (see p.198).

All participants identified the cause of their achievement whether the course outcome was expected or not. However, it was not possible to determine whether the causal attributions were made at interview time, upon the receipt of the course outcome especially for those who did not expect it, or before the completion of the course for students who expected the outcome. Also, it was not possible to determine whether or not the same causal attributions would have been made if it were not for the interview questions which engaged participants in causal search (see p.198). Nevertheless, making causal attributions by participants who did not expect the course outcome whether it was negative, unexpected, or important is in agreement with previous research (see p.27).

A longitudinal comparison of causal attributions amongst and within naturally occurring groups did not depict any significant differences except for participants who changed academic programme (see p.198). Their causal attributions did not include any of the 3 leading key causes (see Table 4.7, p.108). This is a very important finding because it provides evidence that a student, who does not know how to study computer programming, finds the subject difficult, or does not make

any effort to study CP1, is subject to changing his academic programme (see p.138 and p.199). However, the suggested investigation should include many more students of those who changed their academic programme.

Participants cited direct and indirect causal antecedents in congruence with the literature (see p.40). However, there were more direct than indirect causal antecedents (see p.200). The leading causal antecedent 'carelessness' in addition to 'laziness' were mentioned by 36.6% of the sample (see Table 4.18, p.130). It was an alarming figure that affirmed a long held conviction by some teachers at the faculty. About 30% of the students work to pay their tuition fees, a factor influencing their motivation to learn. This contradicts a finding of previous research at the same institution stating that students were not affected by the prevalent economic problems (Rahi 2005, pp.272-3). Other causal antecedents such as 'unfamiliarity with programming' (see p.51) and 'performance of others' (see p.40) were consistent with previous research. There was strong evidence that the personal feeling state about the subject such as liking it plays an important role in forming causal antecedents, which is in agreement with the attribution theory (see p.201). Affective communications from other people such as 'lack of guidance' were infrequent (see p.201). This section shows that the second research question fulfilled the second part of the second research objective which is related to the cues students use to identify causal attributions (see p.7).

The underlying properties of causal attributions

Answers to the third research question supported the presence of the locus of causality, stability, and controllability dimensions. However, there is strong evidence that globality is a fourth dimension in this achievement context (see p.201-3), despite Weiner's rejection (2000, p.4). Knowledge about globality helps in determining whether the causal attribution has influenced one course from one subject area, several courses from one subject area, or courses from several subject areas. Thus, the importance of the globality dimension lies in its predictive power. While 'lack of study' and 'inappropriate learning strategy'

tended to be global, 'appropriate teaching method' tended to be specific. As for 'appropriate learning strategy' and 'lack of practice', their perception was almost equally distributed between global and specific. Perceiving 'lack of study' as global may lead to dropping out from the University, while perceiving it as specific to a subject matter may lead to change of academic programme. Devising attribution retraining programmes can be more efficient when identifying the causal attribution as global or specific.

Each causal attribution was perceived differently in the 4-dimensional causal space except for 'subject difficulty' that was cited by just two students (see Tables 4.19-4.25, pp.136-41). For instance, 'lack of practice' was perceived in 7 different ways out of 16 possible combinations of causal properties by 10 participants (see Tables 4.19, p.127). However, in Weiner's 3-dimentional causal space, 'appropriate learning strategy' was perceived identically - internal, stable, and controllable - by all 13 participants who cited it irrespective of their achievement level. It was not perceived in the same way on the globality dimension. All 5 students who cited 'appropriate teaching method' perceived it as external, stable, and specific (see Tables 4.25, p.132). All 5 students who cited 'inappropriate learning strategy' perceived it as internal (see Tables 4.22, p.131).

For some participants, the causal properties for different causal attributions were identical in the 4-dimensional causal space and perceivers obtained the same outcome such as failing when causal attributions were perceived as internal, stable, uncontrollable, and global (see p.205). Another common causal style emerged: internal, stable, controllable, and global (see p.205).

The majority of participants took personal responsibility for their achievement outcomes including all females (see p.205). Hedonic bias was mildly present within the groups of good, satisfactory, and passing achievers. While this finding is in disagreement with previous research, it shows the importance of forming the sample of five strata of achievement outcomes. This section fulfilled part of the

first part of the third objective of this study that is related to finding how students perceive the underlying properties of causal attributions (see p.7). Another section below (see p.223) shows how the other part was answered.

The stability dimension and expectations of future success

Students' responses to the fourth research question brought about interesting results. By attributing success or failure to an unstable obstructive cause, many participants motivated themselves and actually passed the second course in the sequence, which is consistent with the literature (see p.45). In addition, most participants who attributed their success to stable supportive cause, they motivated themselves and passed the second course in the sequence.

The stability dimension of attribution theory and the expectancy dimension of the Expectancy-Value motivation model do not seem to relate as closely as Weiner (2000, p.5) proposed in his model. The lower the achievement outcome the less the student's expectation of future success matched up with the outcome of the following computer programming course (see pp.207. This result answers one part of the fourth research question (see p.7). The other part is handled by the next section (see p.222).

Many non high-achievers who cited an obstructive causal attribution perceived it as stable. Still, they felt optimistic, motivated, and expected to pass the next course. While some of those actually passed, others failed. This suggests that the past magnitude of an obstructive causal attribution serves a spur in forming an expectation of future success or failure and not only its underlying properties (see p.161).

Except for passing achievers, the stability dimension mapped well with the actual outcomes in the following computer programming course (see Tables 4.19-4.25, pp.136-41). The noted discrepancies between the stability dimension and the actual course outcomes are due to the influence of the other causal dimensions:

locus of causality and controllability. Else, stability would have sufficed to make future predictions. This finding along with the previous ones in this section show the importance of studying the sample based on five achievement levels instead of just success and failure.

The majority of participants shared a positive look towards future success (see p.207). However, there was a weak association between the expectancy dimension of the Expectancy-Value motivation model and the actual achievement outcomes (see p.207). It is very important for future research to determine the sources of this overwhelming expectancy of future success because it will help in better students' guidance.

Emotions related to locus of causality and controllability

The students' responses to the fifth research question showed that the locus of causality and controllability dimensions dependent emotions for the groups of high, good, and satisfactory achievers mapped very well with the value determinant of motivation as suggested by the literature (see p.208). However, for the passing and low achievers they mapped satisfactorily and poorly (see p.208). Again, this shows the importance of forming the sample of five strata of achievement outcomes instead of just two, success and failure.

Most achievers from all achievement levels were motivated by emotional consequences of locus of causality, controllability, or both (see p.208). The better the achievement outcome, the lesser the number of emotions related to locus of causality and controllability. In addition, while for high and good achievers an increase in emotions related to locus of causality brought about motivation, for satisfactory, passing, and low achievers a decrease in emotions brought about motivation (see p.209). Some low achievers had mixed feelings of motivation (see Table 4.46, p.171).

There was evidence that perceiving a cause as internal do not necessarily bring about a change in pride or self-esteem (see p.209). Contrary to previous findings, not all students who attributed their success to an internal cause felt proud of it. Further, emotions emanating from controllability do not necessarily bring about motivation. They may even prohibit it. In addition, motivation brought about from emotions related to locus of control and controllability does not necessarily lead to better achievement outcome than if emotions were related only to one dimension.

Self-confidence was cited by 12 participants in relation to locus of causality (see p.208). This emotion emerged without previous planning and it is worth investigation in future research, especially where computer programming is the subject under focus.

Two passing achievers did not value the course, but they were motivated by emotions related to locus of causality and controllability, and passed the course. This finding supports the non-preserving of the multiplicative formula of the Expectancy-Value motivation model by the attribution theory. The previous section and this one fulfilled the fourth objective of this study (see p.7).

Emerging attributional styles that determine actions in future similar tasks

What the students said in response to research question 6 revealed that the consequences of attributional processes may be predicted, without firm confirmation though, after determining the location of a cause within the three-dimensional causal space by attributers themselves.

Most participants who perceived their obstructive causal attribution as internal or external, unstable, and controllable improved their achievement outcome in the following computer programming course (see p.213). Most students who perceived their obstructive causal attributions as internal or external, stable, and uncontrollable lowered their achievement outcome or failed the next course in the

sequence, or repeated the first course (see p.213). Most participants who perceived their causal attribution as internal or external, stable, and controllable, passed their next course (see p.214).

The findings above show the richness and depth this investigation has reached by following a qualitative case study as it was expected during the study's design. This section fulfils the third objective of the study (see p.7). As such, the purpose and all research objectives (see pp.6-7) were successfully met.

New mode of attribution theory

In future research, Weiner's (2000, p.3) proposed attribution model can be employed with some modifications by: including 1) the phenotype of a causal attribution and its magnitude; 2) globality as a fourth dimension; and 3) self-confidence as a third locus of causality dependent emotion, and excluding the mapping with the Expectancy-Value motivation model.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

Overview

The purpose of this research was to investigate the influence of causal attributions on the motivation of business computing students in computer programming in the computer science department at a Christian Mediterranean university. To fulfil that purpose, six research questions were developed (see p.66). Two consecutive semi-structured interviews were used to obtain the students' perceptions of their achievement outcomes in an introductory computer programming course. In addition, methodological triangulation was employed by examining the university's database to strengthen the study's trustworthiness.

Forty-five students volunteered to share their cognitive and affective experiences with the researcher. The majority of participants were males as was the business computing programme's population from which the sample was drawn and as was the computer science department's population which offers the programme (see Table 4.1, p.98). Participants' ages ranged from 19 to 26 years (see Table 4.3, p.102) with an average of 21.7 years. The majority of participants were Lebanese as was the case with the business computing programme, the computer science department, and the University (see Table 4.4, p.103). To a great extent, the profile of the sample matched up with the population's profile.

Summary of Major Findings

The open-format of interview questions shed some light on multiple causality. While every participant made at least one causal attribution, no one cited more than two. None of the failing students gave two causes. The four causes of the original attribution model were either absent, 'ability' and 'luck', or barely mentioned 'task difficulty' and 'effort'. This shows that the 11 causal attributions made by participants of this study were either cultural or specific to computer programming. The citing of 'appropriate learning strategy' by all high achievers emphasized the importance of forming the sample out of more strata than just success and failure criteria. New classification schemes emerged such as key versus associate causes, and obstructive versus supportive causes. Some obstructive causes were cited by students who passed the course. This shows that the past magnitude of a causal attribution serves as a spur in determining future success or failure (see p.161). Many of the findings here could have been different had the sample size been larger.

A distinguishing factor of this research is its reliance on participants' perceptions of their achievement outcomes on a past event that resulted from a semester long experience. The research is not based on a hypothetical event or on the selection of causes from a predefined list. One important piece of evidence emerged about the possibility of changing academic programme when a student fails the course because he does not know how to study computer programming, does not make any effort to study or finds the subject difficult. It is very important to investigate this finding further because it helps identify students and offer them proper guidance when they are on the verge of changing their academic programme.

Common themes of direct and indirect causal antecedents were identified. Most causal antecedents that guided the making of causal attributions in this study were direct. 'Carelessness' and 'work' were dominant direct causal antecedents. The combined percentage of 'carelessness' and 'laziness' was 36.6% in the

sample, an alarming figure that indicates the need for prompt intervention by concerned people.

Regarding the causal dimensions, there was strong evidence of the presence of a fourth dimension, globality. Different participants perceived some properties of a causal attribution differently on some dimensions including globality while their perceptions matched up exactly or almost exactly on one or more dimensions. By perceiving most causal attributions as internal, the majority of the students held themselves accountable for their achievement outcomes. The self-serving bias was not present within the group of participants who attributed their outcome to internal obstructive causes.

The two components of the Expectancy-Value motivation model did not relate closely to the dimensions of attribution theory as Weiner's (2000) model proposed, especially for low achievers. In addition, the overwhelming expectation of future success in the sample needs further investigation to find out whether it is rooted in culture. Furthermore, a possible third locus of causality dependent emotion, self-confidence, was uncovered in relation with learning computer programming. Finally, the findings show that attribution theory has a predictive power as it was asserted by theorists.

Contextual Factors and Attribution Theory

Early in this investigation, the researcher posited that participants' learning experiences and interpretations cannot be isolated from their context (see p.8 and p.78). The analysis and interpretation of research findings have shown that several contextual factors affected the various stages the participants went through to explain their achievement outcomes from an attributional approach. The major contextual factors that emerged from the research data were learning

computer programming, Lebanon's socio-political/socio-economic conditions, and the Christian community's socio-political context.

Two contextual factors separated the causal attributions: 1) learning the subject discipline under focus: computer programming; and 2) Lebanon's recent socio-political instability, socio-economic uncertainty, and high financial risks. Learning computer programming had a major influence on making causal attributions. It exhibited its presence in participants who cited 'appropriate learning strategy', 'lack of practice', 'inappropriate learning strategy', 'subject difficulty', and 'lack of study' for the two participants who perceived it as specific to the subject (see p.219). This contextual factor, learning computer programming, influenced 71.1% of the sample. This figure is arrived at by adding the percentages in rows 2 to 5 in table 4.8 plus 4.4% that represent the two participants who cited 'lack of study' and perceived it as specific to the subject.

The second contextual factor in importance was Lebanon's recent socio-political instability, socio-economic uncertainty, and high financial risks. It obstructed the learning experience of about one third of the participants. This is revealed through participants who cited 'lack of study' and 'lack of effort' and who perceived these two causes as global, that is causing not only the outcome of CP1, but every other course taken simultaneously with it (see p.8 and p.77). The causal attribution 'lack of study' did not appear in previous research (see p.193) possibly because it was conducted in different contexts. In this study, many students chose not to study either because they believed that the socio-economic uncertainty will remain prevailing after they obtain their degree and consequently they will not be employed for the lack of job opportunities in the private sector or that the socio-political instability will remain prevailing and consequently the public sector related jobs will keep going to other religious sects within the country. Also, the two traditional causal attributions 'ability' and 'luck' were not cited by participants in this context. This finding clarified the bewilderment stated on page 63, in the literature review, about the relevance of traditional

causal attributions to the subject discipline under focus and the context of this study. Furthermore, the conviction that causal attributions may not be the same in different subjects and contexts gained support (see p.191).

The two contextual factors cited in the previous paragraph along with the Christian community socio-political context in which the University is located separated the causal antecedents that were mentioned by the 45 participants. Causal antecedents are sources of information that serve as goads to causal attributions. Firstly, the influence of computer programming as a subject on participants was exhibited in their mentioning of the causal antecedents 'unfamiliarity with programming', 'liking programming', 'familiarity with programming', and 'indifferent to programming'.

Secondly, Lebanon's socio-political instability, socio-economic uncertainty, and high financial risks have been leading to poverty which revealed itself through 29.9% of participants who mentioned the causal antecedent 'work' as a source of their causal attribution (see p.200). In the recent history of Lebanon, having students from low-income backgrounds do part-time work to pay their way through university became common.

Thirdly, the recent socio-political context of the Christian community that serves as the main human reservoir in the formation of the student population in the University in this study has possibly influenced the mention of the causal antecedent 'carelessness'. The reason for this is that, at the time the participants of the study took CP1, the majority of the Christian community felt marginalized by the Syrian occupation which ended on April 26, 2005, and then threatened by a series of deadly explosions that hit the areas where their presence was dominant and assassinations of many of their leading political figures. As a result, many of the Christian youth were losing faith in their future. This confirms what was posited earlier in the study that the findings can best be understood by situating them in the study's wider context (see pp.77-8).

In addition to its influence on the formation of causal antecedents, the Christian community religious context had its influence, possibly, on participants in taking personal responsibility for their achievement outcomes. The majority of participants perceived their causal attributions as internal (see pp.205-6). Also, the majority of participants expected to pass the course.

Further, Lebanon's socio-political instability and socio-economic uncertainty seem to have had their influence on the emergence of globality from the research data. In this study, the globality dimension referred to whether a perceived cause had influenced a student's motivation in all courses taken along with CP1 or in CP1 only (Phelps and Ellis 2002, p.516). For instance, the majority of students who cited 'lack of studying' as a causal attribution perceived it as global (see Table 4.19, p.136). That is, those participants told the interviewer that they were not studying for any of their courses that particular semester when they took CP1. Living in a country, troubled since 1975, might have undermined the participants' confidence in the future of Lebanon and consequently their own. Learners' lack of confidence in their future can have a damaging effect on ambitions that can be achieved through studying. The emergence of globality in this study might help in coining it as a fourth dimension of attribution theory (see pp.201-3).

In addition to its influence on the formation of causal attributions and causal antecedents, the subject of computer programming has influenced the emergence of the self-confidence emotion in students in relation to locus of causality. Finally, it is worth mentioning that the business computing academic program might have contributed to the kind of mapping between the dimensions of attribution theory and the Expectancy-Value motivation model that emerged from the research data. Some participants mentioned that they engaged in doing extra work in computer programming because of their value to them. For business computing students, programming may not be the area they want to work in after obtaining the degree.

Limitations of the Study

The most important limitation of this case study is that its findings cannot be generalized to the population of business computing programme because of the small sample size and because participants were not selected randomly (Adler and Clark 2008, p.123). A small sample size was chosen because an in-depth case study limited by time was sought (see p.88) (Platt 2007, p.111). The in-depth exploration generated a volume of data that was only manageable by using tabulation (see p.115). Nevertheless, the findings of this study were indicative.

Another major limitation is the researcher's relationship with the participants. He not only taught all those students the computer programming course, but he was also the academic advisor to some of them. He has been the only teacher of computer programming courses in the business computing programme. The findings might be biased because perhaps the feelings of students were mixed with his while he collected information during face-to-face interviews with them. In addition, some participants might have fabricated perceptions to satisfy the interviewer by taking into consideration that he is their teacher, advisor, or both. However, the teacher's role as a researcher is commended by some authors because they believe it decreases the wide gap between research and practice (Horner and Gaither 2004, p.165).

The study followed a qualitative orientation. Therefore, it was subjective. Validation of the transcripts was influenced by the fact that some of the students were more proficient than others in English language. Finally, there was a lack of literature on motivation from an attributional approach in the computer programming area.

Importance of the Study

This pioneer study on the motivation of computer programming undergraduate students from an attributional approach brought about several contributions to knowledge about learning computer programming, learners in the context of the study, and attribution theory. First, eleven causal attributions related either to the Lebanese culture or to the learning of computer programming were uncovered which should influence practice (see p.116). Second, forming the sample of more strata than just success and failure permitted uncovering key issues related to each strata such as the one representing high-achievers (see p.122). Third, some causal antecedents such as 'carelessness', 'laziness', and 'work' should alert the people in authority at this university to make appropriate changes to current policy (see p.200). Fourth, there is evidence of the presence of globality as a fourth dimension which should interest attribution theory researchers (see pp.201-3). Fifth, most participants perceived their causal attributions as internal which should interest educationalists and social psychologists (see pp.205-6). Sixth, there is evidence that the two components of the Expectancy-Value motivation model do not relate closely to the dimensions of attribution theory as proposed in Weiner's (2000) model (see p.207 and p.210). Seventh, a possible third locus of causality dependent emotion, self-confidence, was uncovered (see p.208). Finally, this study showed that attribution has a predictive power as many research has asserted (see p.212).

The researcher will plan and conduct try-out activities with his students based on attribution retraining ideas. In addition, presentations will be made to colleagues and university administrators, and at regional and international conferences such as 'The Bera Annual Conference 2008'. Most important, publications will be sought for professional and career advancement.

Implications of the Study

While the study's limitations make it difficult to generalize in terms of implications, the researcher would like to share with the reader some conclusions that were reached upon the completion of the investigation.

This study's findings serve as building blocks for future research in the area of computer programming. Knowledge about motivation is now different mainly after uncovering eleven causal attributions related to computer programming, identifying a fourth dimension of causality, and finding out which causal styles lead to success and which one lead to failure. In addition, showing that the two determinants of the Expectancy-Value motivation model do not relate closely to attribution model is a serious issue that needs further investigation.

The interview did not have a major effect on the course of events of interviewees whose programming course was in progress. However, it was viewed as a preparatory step towards the diagnosis, planning, and implementation of an appropriate attribution retraining programme.

The findings of this study might enlighten computer programming teachers regarding how their students approach learning this subject-matter (see pp.189-91, pp.201-3, and pp.205-6). This insight might help them make informed decisions about their current teaching methods by leading them to approach their students in ways that bring about more motivation and consequently better achievement outcomes. Some students gave evidence that an 'appropriate teaching method' in computer programming was crucial in the process of promoting themselves to the level of a high achiever (see p.194) especially since this subject-matter is not widely taught at schools. In addition, computer programming teachers might change their ways of communication with their students based on the students' attributional style (p.212) which might bring about better learning experiences (Elliot and Dweck 2005, p.305).

Carelessness and laziness were cited by 36.6% of the participants (see Table 4.18, p.130). This important finding should be conveyed to MSU's administrators who should take appropriate action. Furthermore, although infrequent, the presence of the causal antecedent 'lack of guidance' shows the importance of running periodic orientation sessions specific to business computing students (Graunke and Woosley 2005, p.6).

The sampling plan that recruited students from five different achievement outcomes was successful in identifying issues that would not be possible had the study just focused on success and failure groups. The group of high achievers was distinguished by three factors: by making the same causal attributions, by the way they perceived underlying properties, and by showing that controllability is different from globality (see p.122). This was a major contribution to the research.

'Inappropriate learning strategy' (see p.138) indicates that students should be taught how to study early in the course. In addition, it is worth taking some time regularly to discuss with students their learning strategies and compare them to strategies followed by previous successful learners. More recognition should be given to students who are in the process of implementing an 'appropriate learning strategy', while the others should be encouraged to do so before it is too late.

Recommendations for Future Research

In light of the existing literature and this study, some gaps in the understanding of motivation in learning computer programming from an attributional approach in computer programming were identified. It would be worthwhile to cover those gaps by conducting further research based on the recommendations below:

1. Future research should include participants from other programs that offer introductory-level computer programming courses, from different universities residing in various geographical locations in and outside Lebanon. Such studies might be able to confirm whether the same causal attributions and related constructs will be revealed, and whether they will be influenced by the same or similar contextual factors such as learning computer programming, the country's socio-political/socio-economic conditions, and the Christian community religious context to which the University belongs.

2. The previous recommendation can be implemented by encompassing students learning computer programming from intermediate and advanced programming levels which might make findings more pronounced or take research into new venues.

3. It is important to investigate the causal attributions and their underlying properties of students who change their academic programme. This will help in verifying whether infrequent causal attributions that were identified in this study are reasons for changing academic programme in computer programming. With a bigger sample other causal attributions might be uncovered. This will be helpful in aiding such students at early stages to overcome obstacles facing their learning processes and to increase their learning motivation before they apply for changing academic programme. For many years, students have been applying to change academic programme, but no record has been kept about the causes and no plans has been put forth to prevent similar situations from arising again.

4. It is important to investigate the classification schemes that emerged in this study: key versus associate causes, and supportive versus obstructive causes.

5. The classification of causes as success causes, failure causes, or both shed light on a new category of causes that encompasses obstructive causes associated with both success and failure. This needs further investigation because in previous research, negative causes were associated with just failure outcomes.

6. Forming the sample out of five different achievement outcome strata instead of just success and failure brought about important contributions to research. However, it is recommended that the study be repeated by forming a sample of just three strata: high achievers, middle achievers, and low achievers.

7. The present research supported the presence of globality as some research did, but Weiner (2000, p.4) had refuted this possibility. More research is needed in this regard.

8. No gender differences were noted in this study possibly because of the small sample size. A larger-scale study is needed with more female participants especially from the low achievement group in computer programming.

9. It is important to find out why most participants perceived their causal attributions as internal rather than external. This will shed light on whether taking responsibility of educational outcomes is influenced by the Christian community religious context or by Lebanon's culture. Also, this applies on the overwhelming expectation of passing courses.

10. Investigate whether self-confidence is a locus of causality dependent emotion in learning computer programming and/or in other subject disciplines.

11. Investigate multiple causality by using open-format research questions followed by probing questions.

12. Given the major influence of the subject of computer programming on attribution theory, and based on the causal attributions and causal antecedents that fell under this rubric such as 'appropriate learning strategy', it is important to investigate in-depth this so called appropriate learning strategy and whether there are learning styles that are best fit to learning computer programming.

13. Investigate whether constructs of 'carelessness' and 'laziness' are the results of peer pressure.

14. When studying motivation in learning computer programming from an attributional approach, investigate whether students value a course because it is part of their academic program, or because of their intrinsic interest in the subject discipline it belongs too. The reason for this is that a business computing student goal may vary from the desire to become a programmer, to primarily just passing the computer programming course.

Although attribution theory is not the only road to understanding motivation, it provided a very useful framework for asking useful questions. Many writers and researchers agree that this framework increasingly provides research opportunities to bring about educational environments that energize students to work towards success (Weiner 2000, p.1). Through this case study, attribution theory offered important findings to the field of computer programming and offered exciting possibilities for future research in the Middle East and the rest of the world (Platt 2007, p.112). In addition to filling a gap in the existing body of knowledge, the findings show promise in helping researchers, educators, and practitioners to understand motivation in learning computer programming from an attributional perspective. The researcher strongly believes that the recommendations above would instigate new research venues, especially since research in computer programming is almost non-existent although it is a subject matter that has been taught and learned world wide.

I have enjoyed and benefited from undertaking this research in many ways. First, this research fits in with my long term career of teaching and learning computer programming. Second, I have fully appreciated the attribution perspective used to understand motivation in the achievement context where I actually work. This new awareness will help me propose solutions to some problems that need to be addressed. Third, new knowledge is acquired in the fields of education, social psychology, computer education, teaching and learning of undergraduates, and research methodologies. Fourth, through designing and conducting this research, I gained hands-on experience in conducting research including implementing ethical practices, establishing research credibility, and using qualitative software. This will help me conduct and publish more research which will make universities in Lebanon view me more favorably. Finally, I am proud of meeting and working with professors of high caliber who, through their support and guidance, made my working toward my doctoral degree such a rewarding and worthwhile experience.

APPENDIX A: LETTER OF INFORMED CONSENT

Faculty of Natural and Applied Sciences
MSU
Lebanon

To: Business Computing Students
From: Nazir Hawi, Senior Lecturer and Business Computing Advisor
Date: February 10, 2007
Re: Participation in research study/Letter of Informed Consent

Dear student,

This letter is a request for your participation in a research study that will constitute the final credit towards my degree of Doctor of Education at the University of Leicester. The title of my study is: *An Attributional Approach to Computer Programming Achievement of Undergraduate Business Computing Students in a University Computer Science Department*.

Your participation would enable me to collect important information to complete my study. I am interested in obtaining your views and perceptions about academic motivation and its role in relation to your achievement in the Computer Programming I course. The interview will be conducted in Arabic. If you agree, you sit for an interview. I will be the interviewer. The interview should take about 30 minutes. It should be recorded and saved as a sound file using a laptop computer. Your participation is voluntary. You have the right to refuse to answer sensitive questions or to withdraw from the interview at any time.

I realize your schedule is a busy one and that your time is valuable. I hope that the results will be useful for the University decision makers, benefit prospective business computing students, and have a major contribution to research. You may be assured of complete confidentiality. All data will be treated anonymously and kept in a safe place. No individuals will be identified and data will be analyzed for the entire group of participants. A copy of the research findings will be provided to you upon your request.

The University Research Board at MSU has no objection to conducting the study on campus. The computer science chairperson approved this study. For additional information, please contact me by phone or via email.

Your participation in this study is greatly appreciated.

Mr. Nazir Hawi
Computer Science Department
Office #: S226
Phone extension: 2361
Email: nhawi@ndu.edu.lb

I hereby consent to participate in this research study.

Name: _____

Date: _____

APPENDIX B: DEMOGRAPHIC DATA FORM

Faculty of Natural and Applied Sciences
MSU
Lebanon

To: Business Computing Students
From: Nazir Hawi, Senior Lecturer and Business Computing Advisor
Date: February 10, 2007
Re: Participation in research study/Personal Demographic Information

Dear participant,

Completing the personal demographic information form below is greatly appreciated. You may be assured of complete confidentiality. All data will be treated anonymously and kept in a safe place. No individuals will be identified and data will be analyzed for the entire group of participants.

I thank you for sharing with me your valuable time.

1. ID: _____ 2. Age: _____ 3. Circle gender: Male Female

4. Did you have any computer knowledge prior to the computer programming course? Please specify.

5. Select your "Computer Programming I" course grade by entering 1 below the grade. Enter 2 below the appropriate grade if you took the course a second time, 3 for the third time etc…

W	UW	F	D	D+	C-	C	C+	B-	B

B+	A-	A	A+

6. Circle academic level at interview time: Sophomore Junior Senior

7. Telephone number:

8. E-mail:

Thank you

APPENDIX C: REQUEST FOR EXAMINING OFFICIAL RECORDS

Faculty of Natural and Applied Sciences
MSU
Lebanon

To: Business Computing Students
From: Nazir Hawi, Senior Lecturer and Business Computing Advisor
Date: February 10, 2007
Re: Participation in research study/Examining Transcript of Grades

Dear student,

This letter is a request for your approval to allow the researcher to examine your official records including your transcript of grades. You have already been interviewed in this research study that constitutes the final credit towards my degree of Doctor of Education at University of Leicester.

Thank you for the valuable time you gave me by going through the interview. You have the right to refuse this additional request. You may be assured of complete confidentiality. All data will be treated anonymously and kept in a safe place. No individuals will be identified and data will be analyzed for the entire group of participants.

Your approval to this request is greatly appreciated.
In advance, thank you for your assistance again.

Mr. Nazir Hawi
Computer Science

Department

Office #: S226
Phone extension: 2361
Email: nhawi@ndu.edu.lb

I hereby consent to permit the researcher to examine my transcript of grades.

Name: _____

ID: _____

Date: _____

Thank you

APPENDIX D: RESEARCH INSTRUMENT

Please try to remember the outcome of the course Computer Programming I.

What did you feel upon the receipt of your grade (Happy, Sad)?
(Appraisal of outcome)

Were you expecting that outcome?
(Instigation of attributional processes)

What would you feel would have caused the course outcome?
(Causal attributions)

Why do you believe that that was the reason of the course outcome?
(**Causal antecedents to causal attributions)**

Is the cause of your achievement due to something about you or something about other people or circumstances?
(Causal dimensions – Locus of causality)

How did the locus of this cause affect your self-esteem?
(Locus of causality - value determinant of motivation, psychological consequence)

Is the cause of your achievement changing over time?
(Causal dimensions – stability)

What is your expectation of future success in computer programming courses?
(Stability – expectancy of success determinant of motivation)

Did you perceive the cause of your achievement as controllable or uncontrollable?
(Causal dimensions – controllability)

Did you feel shame, guilt, anger, gratitude, or pity?
(Controllability - value determinant of motivation, psychological consequence)

Did the cause of your achievement influence your achievement just in the computer programming course or all other subject areas?
(Causal dimensions – globality)

What effect did your expectation of future success along with other felt emotions have on your achievement striving?
(Expectancy of success along with emotions determine subsequent behaviour)

APPENDIX E: CODE LIST

The code list below was used to code participants' responses to research questions using HyperResearch. Codes appear in alphabetical order as generated by the software. Blank lines were introduced to visually group related code.

1. Academic level is graduate
2. Academic level is junior
3. Academic level is senior
4. Academic level is sophomore

5. Achievement striving helped
6. Achievement striving hindered

7. Age is 19 at interview time
8. Age is 20 at interview time
9. Age is 21 at interview time
10. Age is 22 at interview time
11. Age is 23 at interview time
12. Age is 24 at interview time
13. Age is 25 at interview time
14. Age is 26 at interview time

15. Causal antecedent - Academic Probation
16. Causal antecedent - Carelessness
17. Causal antecedent - Democracy
18. Causal antecedent - Familiarity with programming
19. Causal antecedent - Good teaching
20. Causal antecedent - Indifferent to programming
21. Causal antecedent - Lack of guidance
22. Causal antecedent - Laziness
23. Causal antecedent - Liking programming
24. Causal antecedent - Performance of others
25. Causal antecedent - Psychological state
26. Causal antecedent - Sickness
27. Causal antecedent - Teacher did his best
28. Causal antecedent - Unfamiliarity with programming
29. Causal antecedent - Work

30. Cause 1 is appropriate learning strategy
31. Cause 1 is inappropriate learning strategy
32. Cause 1 is lack of effort
33. Cause 1 is lack of practice
34. Cause 1 is lack of study
35. Cause 1 is subject difficulty

36. Cause 1 controllable
37. Cause 1 external
38. Cause 1 global
39. Cause 1 internal
40. Cause 1 specific
41. Cause 1 stable
42. Cause 1 uncontrollable
43. Cause 1 unstable

44. Cause 2 is appropriate teaching method
45. Cause 2 is cheating
46. Cause 2 is exam anxiety
47. Cause 2 is lack of time
48. Cause 2 is unfair treatment

49. Cause 2 controllable
50. Cause 2 external
51. Cause 2 global
52. Cause 2 internal
53. Cause 2 specific
54. Cause 2 stable
55. Cause 2 uncontrollable
56. Cause 2 unstable

57. Controllability PC A cause 1 anger
58. Controllability PC A cause 1 gratitude
59. Controllability PC A cause 1 guilt
60. Controllability PC A cause 1 no anger
61. Controllability PC A cause 1 no gratitude
62. Controllability PC A cause 1 no guilt
63. Controllability PC A cause 1 no pity
64. Controllability PC A cause 1 no shame
65. Controllability PC A cause 1 pity
66. Controllability PC A cause 1 shame

67. Controllability PC A cause 2 anger
68. Controllability PC A cause 2 gratitude
69. Controllability PC A cause 2 guilt
70. Controllability PC A cause 2 no anger
71. Controllability PC A cause 2 no guilt
72. Controllability PC A cause 2 no pity
73. Controllability PC A cause 2 no shame

74. CP1 2nd attempt grade was C [CP1 = Computer Programming 1]
75. CP1 2nd attempt grade was D
76. CP1 2nd attempt grade was F

77. CP1 grade expected
78. CP1 grade not expected

79. CP1 grade was A [Computer Programming I grade was either A+, A, or A-]
80. CP1 grade was B [Computer Programming I grade was either B+, B, or B-]
81. CP1 grade was C [Computer Programming I grade was either C+, C]
82. CP1 grade was D [Computer Programming I grade was either C-, D+, or D]
83. CP1 grade was F [Computer Programming I grade was F]

84. CP1 was not valued
85. CP1 was valued

86. CP2 grade course not taken yet [CP2 = Computer Programming 2]
87. CP2 grade was A
88. CP2 grade was B
89. CP2 grade was C
90. CP2 grade was D
91. CP2 grade was F

92. Feeling anger cause 1 decreased motivation
93. Feeling anger cause 1 did not affect motivation
94. Feeling anger cause 1 increased motivation
95. Feeling anger non-existent cause 1 not affected motivation

96. Feeling anger cause 2 increased motivation

97. Feeling gratitude cause 1 increased motivation
98. Feeling gratitude cause 1 not affected motivation
99. Feeling gratitude not affected cause 1 not affected motivation

100. Feeling gratitude cause 2 increased motivation

101. Feeling guilt cause 1 increased motivation
102. Feeling guilt cause 1 not affected motivation
103. Feeling guilt non-existent cause 1 not affected motivation

104. Feeling guilt non-existent cause 2 not affected motivation

105. Feeling optimistic cause 1 did not motivate me
106. Feeling optimistic cause 1 motivated me

107. Feeling optimistic cause 2 motivated me

108. Feeling pessimistic cause 1 did not inhibit my motivation
109. Feeling pessimistic cause 1 did not motivate me

110. Feeling pity cause 1 decreased motivation
111. Feeling pity cause 1 did not affect motivation
112. Feeling pity cause 1 increased motivation
113. Feeling pity non-existent cause 1 not affected motivation

114. Feeling pity non-existent cause 2 not affected motivation

115. Feeling pride decrease cause 1 decreased motivation
116. Feeling pride decrease cause 1 increased motivation
117. Feeling pride decrease cause 1 not affected motivation
118. Feeling pride increase cause 1 increased motivation
119. Feeling pride not affected cause 1 increased motivation
120. Feeling pride not affected cause 1 not affected motivation

121. Feeling pride decrease cause 2 increased motivation
122. Feeling pride increase cause 2 increased motivation

123. Feeling self-confidence decreased cause 1 decreased motivation
124. Feeling self-confidence decreased cause 1 increased motivation
125. Feeling self-confidence increased cause 1 increased motivation
126. Feeling self-confidence not affected cause 1 increased motivation
127. Feeling self-confidence not affected cause 1 not affected motivation

128. Feeling self-confidence increased cause 2 increased motivation
129. Feeling self-confidence decreased cause 2 increased motivation

130. Feeling self-esteem decreased cause 1 decreased motivation
131. Feeling self-esteem decreased cause 1 increased motivation
132. Feeling self-esteem decreased cause 1 not affected motivation
133. Feeling self-esteem increased cause 1 increased motivation
134. Feeling self-esteem not affected cause 1 not affected motivation

135. Feeling self-esteem not affected cause 2 not affected motivation
136. Feeling self-esteem increased cause 2 increased motivation

137. Feeling shame cause 1 did not affect motivation
138. Feeling shame cause 1 increased motivation
139. Feeling shame non-existent cause 1 not affected motivation

140. Feeling shame non-existent cause 2 not affected motivation

141. Grade dependent affect happy
142. Grade dependent affect sad
143. Grade dependent affect satisfied

144. Locus of causality PC A cause 1 pride decreased [PC = psychological consequence]
145. Locus of causality PC A cause 1 pride increased [A = affective]
146. Locus of causality PC A cause 1 pride not affected

147. Locus of causality PC A cause 1 self-confidence decreased
148. Locus of causality PC A cause 1 self-confidence increased
149. Locus of causality PC A cause 1 self-confidence not affected

150. Locus of causality PC A cause 1 self-esteem decreased
151. Locus of causality PC A cause 1 self-esteem increased
152. Locus of causality PC A cause 1 self-esteem not affected

153. Locus of causality PC A cause 2 pride decreased
154. Locus of causality PC A cause 2 pride increased
155. Locus of causality PC A cause 2 pride not affected

156. Locus of causality PC A cause 2 self-confidence decreased
157. Locus of causality PC A cause 2 self-confidence increased

158. Locus of causality PC A cause 2 self-esteem decreased
159. Locus of causality PC A cause 2 self-esteem increased
160. Locus of causality PC A cause 2 self-esteem not affected

161. Sex of participant is female
162. Sex of participant is male

163. Stability PC A cause 1 optimistic of passing the next course
164. Stability PC A cause 1 pessimistic of passing the next course

165. Stability PC A cause 2 optimistic of passing the next course

166. Stability PC C cause 1 future success is expected [C = cognition]

167. Stability PC C cause 1 future success is not expected

168. Stability PC C cause 2 future success is expected

APPENDIX F: ANALYSIS OF RESEARCH DATA

Sub-theme: causal properties – locus of causality – question asked by the researcher

Is the cause of your achievement due to something about you or something about other people or circumstances?

Sub-theme: causal properties - locus of causality - internal

Looking at what each of the participants said in response to the question above led the researcher to create two Causal Property codes 'internal' and 'external' which reflected two emergent sub-themes in what students had said to him during their interviews. Below are extracts, each from different source files, that illustrate the text, said by participants in response to the question above, on which the code 'internal' was applied. While 'internal' is used in the thesis, line 39 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that they were the cause of their achievement outcome.

[Participant 17]

R: I am the cause.

[Participant 18]

R: Of course I have caused the outcome!

[Participant 19]

R: Definitely, it is me.

[Participant 20]

R: Internal

[Participant 21]

R: I was the source of the problem, the cause was not external to me / the problem was neither the teacher nor the course / the problem was internal to me

Sub-theme: causal properties - locus of causality - external

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'external' was applied. While 'external' is used in the thesis, line 37 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that the cause of their achievement outcome was external to them.

[Participant 1]

R: External

[Participant 33]

R: It was out of my hands.

[Participant 37]

R: The cause was external, it was out of my hands, outside my will, outside the university too

[Participant 41]

R: It was external to me.

Sub-theme: causal properties – stability - question

Did you feel that the cause of your achievement will change over time?

Sub-theme: causal properties – stability - stable

Looking at what each of the participants said in response to the question above led the researcher to create two Causal Property codes 'stable' and 'unstable'

which reflected emergent sub-themes in what students had said to him during their interviews. Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code ‘stable’ was applied. While ‘stable’ is used in the thesis, line 41 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that their causal attribution will not change with time.

[Participant 1]
R: Stable

[Participant 7]
R: No, not really, everything is remaining the same

[Participant 13]
R: It will persevere.

[Participant 14]
R: No, it will not change

[Participant 19]
R: I perceived the learning strategy as stable.

[Participant 21]
R: Yes, that is why I changed my major.

Sub-theme: causal properties – stability - unstable

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code ‘unstable’ was applied. While ‘unstable’ is used in the thesis, line 43 in Appendix E shows

the code that represented it in the Code List Editor of HyperResearch. All participants below said that their causal attribution will change with time.

[Participant 4]

R: Sure, later I reposed more / I had the opportunity to study more

[Participant 9]

R: Yes, definitely, because my mistake lies in using an inappropriate learning strategy

[Participant 10]

R: It depends on my grades before. If I do not have good grades, I study for the final. If I have good grades, I do not study for the final.

[Participant 24]

R: It should not be stable because my goal is set and that is to continue.

Sub-theme: causal properties – controllability - question asked by the researcher

Did you perceive the cause of your achievement as controllable or uncontrollable?

Sub-theme: causal properties – controllability - controllable

Looking at what each of the participants said in response to the question above led the researcher to create two Causal Property codes 'controllable' and 'uncontrollable' which reflected two emergent sub-themes in what students had said to him during their interviews. Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'controllable' was applied. While 'controllable' is used in the thesis, line 36 in Appendix E shows the code that represented it in the Code

List Editor of HyperResearch. All participants below said that their causal attribution was controllable.

[Participant 2]

R: I was in control / it was up to me

[Participant 31]

R: Yes, because first of all I used to understand most of the code, while building new programs I used to face some problems, but always found ways to correct them.

[Participant 32]

R: In VB 1 I was in control. I knew what I was doing. The course was easy for me.

[Participant 37]

R: At the beginning I thought it was uncontrollable. It was not me who caused the sickness so that I can remove it and it was beyond my control, but it became under my control I was able to proceed

[Participant 38]

R: Controllable.

[Participant 39]

R: it was under my control because I was decided to do it this way

[Participant 45]

R: Yes. The cause was controllable.

Sub-theme: causal properties – controllability - uncontrollable

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'uncontrollable' was applied. While 'uncontrollable' is used in the thesis, line 42

in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that their causal attribution was uncontrollable.

[Participant 5]

R: For sure no. It was a period of frivolousness

[Participant 14]

R: It was beyond my control because when I am not on campus I am at work / this pushed me to fall / when I had a vacation day, I tried to study, but when you are tired you cannot study / and when you are all the time between work and university when there is a little bit of free time you try to go and have some fun.

[Participant 21]

R: Yes, uncontrollable from my perspective.

[Participant 41]

R: Uncontrollable

[Participant 43]

R: No, no it was out of control.

Sub-theme: causal properties – glolability – question asked by the researcher

Did the cause of your achievement influence your achievement just in the computer programming course or all other subject areas?

Sub-theme: causal properties – glolability - global

Looking at what each of the participants said in response to the question above led the researcher to create two Causal Property codes 'global' and 'specific' in which reflected two emergent sub-themes in what students had said to him during their interviews. Below are extracts, each from a different source file, that

illustrate the text, said by participants in response to the question above, on which the code ‘global’ was applied. While ‘global’ is used in the thesis, line 38 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. The code ‘global’ means that the interviewee’s cited causal attribution affected all the courses that were taken with the computer programming course under focus.

[Participant 5]

R: I was not working but overall I did not study for all my courses

[Participant 10]

R: Yes, in all subject areas.

[Participant 11]

R: I went through a period where I was careless in many subjects, work, the country’s political situation, I am the kind of person who cannot live under such pressure

[Participant 13]

R: I used to balance out the time amongst courses / studying at home helped me pass all the other courses

[Participant 14]

R: All the subjects, all the subjects / I am the type of person that cannot give VB more time than other courses

[Participant 15]

R: After test 1, I knew how to study and I tried to implement the same way in other courses and it worked well for me / I felt that if you practice things get easier and better

[Participant 22]

R: All my grades were the same / any new student will act the same during the first semester / all the students I know of had low grades at the beginning, in general

Sub-theme: causal properties – glolability - specific

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'specific' was applied. While 'specific' is used in the thesis, line 40 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. The code 'specific' means that the interviewee's cited causal attribution affected only the course under focus.

[Participant 21]

R: I realized that I will be repeating every course 3 to 4 times to pass it / I am working and I cannot afford repeating my courses, consequently I changed my major

Q: What about the other courses?

R: The outcomes of courses unrelated to programming were good. I had problems, but overall the results were good.

[Participant 28]

R: I learned that if I work on a daily basis, it is better / in programming you cannot leave the material accumulate / in other courses you do not need analysis

[Participant 29]

R: No, every course had its own concept / one course fell in a domain that I dislike, one course fell in a domain that I like, it depends, it is motivation that brings about a grade

[Participant 32]

R: They were affected, but VB is affected more / VB requires practice, other courses do not need practice, just this

[Participant 35]

R: I can not be precise, but my major in general is programming / CSC 216 was programming, it was my first programming course / regarding the others, their grades would not concern me / I was not interested in the other courses in as much as becoming sharp in programming

Sub-theme: causal antecedents – question asked by the researcher

Why do you believe that that was the reason of the course outcome?

Sub-theme: causal antecedents – carelessness

Looking at what each of the participants said in response to the question above led the researcher to create several Causal Antecedent codes such as 'carelessness', 'work', 'performance of others', and unfamiliarity with programming which reflected emergent sub-themes in what students had said to him during their interviews. Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'carelessness' was applied. While 'carelessness' is used in the thesis, line 16 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below mentioned that they were careless, did not take things seriously, frivolous, or indifferent.

[Participant 2]

R: at the beginning you take things carelessly but after spending some time at the university you start thinking that there is something you should do, your are not going to the university for no reason

[Participant 8]

R: honestly speaking I missed many sessions at the beginning of the course / when I entered the university, I did take things seriously / I missed many sessions / I used to enter the class unaware of all the previously taught topics / I did not learn those topics, so I could not catch up

[Participant 27]

R: I was young and frivolous

[Participant 35]

R: I was careless / in the middle of the course, at the end, I became interested and I improved my grade / I felt that if I started well since the beginning I could have achieved better

[Participant 45]

R: It was like I was indifferent

Sub-theme: causal antecedents – work

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'work' was applied. While 'work' is used in the thesis, line 29 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below work to pay their way through university.

[Participant 3]

R: Sometimes I work / I remain busy

[Participant 4]

R: I used to work outside the university and inside the university, I had a financial aid / I did not have time to study

[Participant 6]

R: I was working at ESQUA which took a lot of my time / without all the pressure I could have obtained a better grade

[Participant 14]

R: I did not have time to study for the course because I work while I am earning a degree

[Participant 16]

R: I was employed

Sub-theme: causal antecedents – unfamiliarity with programming

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'unfamiliarity with programming' was applied. While 'unfamiliarity with programming' is used in the thesis, line 28 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that computer programming was a new subject to them. Computer programming is not taught in most schools in Lebanon.

[Participant 9]

R: in CSC 216, programming was new to me

[Participant 15]

R: it was my first semester at the university, I did not know exactly how to do programming

[Participant 18]

R: I was learning something new

[Participant 22]

R: programming was a new idea to us

[Participant 23]

R: I had no idea about programming. VB.NET 1 was the first course I take when I enrolled in Business Computing

Sub-theme: causal antecedents – performance of others

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code

‘performance of others’ was applied. While ‘performance of others’ is used in the thesis, line 24 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. Each participant below compared his performance with that of the other students that were taking the same course.

[Participant 8]

R: I used to miss classes / when I enter the class I used to find out that all the students know the material

[Participant 9]

R: I saw that others obtained very good grades

[Participant 11]

R: I felt that there are many students who were more knowledgeable than I was

[Participant 12]

R: My friends had their exams’ grades close to mine, but they have made a lot of assignments, their grades were a little bit higher / therefore, that is the cause

[Participant 23]

R: When you notice that some students are better than the others, maybe the others participate more than it is adequate / when you are new it takes you some time to remember or to pose a question, meanwhile someone else already knows it and say it, so this way I lose my chance to participate in class, but this is related to life in general, the social world / a person who knows more than the other

Stability – expectancy of success determinant of motivation - question asked by the researcher

Did you expect to pass the next course CSC 217?

Stability – future success is expected

Looking at what each of the participants said in response to the question above led the researcher to create two Future Success codes 'expected' and 'not expected' which reflected two emergent sub-themes in what students had said to him during their interviews. Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'expected' was applied. While 'expected' is used in the thesis, line 77 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that they expected to pass the next computer programming course in the sequence of computer programming courses.

[Participant 17]

R: Yes, because I was going to adopt the same way of studying.

[Participant 18]

R: Of course, I expected to pass the course

[Participant 19]

R: I expected to take more than a B

[Participant 20]

R: Yes / since I am repeating the course I should not end up with a D or C / I should get a B / this is my goal

[Participant 24]

R: Yes

[Participant 25]

R: I will succeed

Stability – future success is not expected

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'not expected' was applied. While 'not expected' is used in the thesis, line 78 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that they did not expect to pass the next computer programming course in the sequence of computer programming courses.

[Participant 16]

R: No, because it will need time and I was still concentrating on my job / I did not have time, I would have failed it

[Participant 21]

R: I felt that I will face problems in passing CSC 217

[Participant 22]

R: I thought it will be more difficult.

[Participant 41]

R: I doubted being able to pass CSC 217

Sub-theme: achievement striving - question asked by the researcher

What effect did your expectation of future success along with other felt emotions have on your achievement striving?

Sub-theme: achievement striving - achievement striving helped

Looking at what each of the participants said in response to the question above led the researcher to create two Achievement Striving codes 'helped' and 'hindered' which reflected two emergent sub-themes in what students had said to him during their interviews. Below are extracts, each from a different source file,

that illustrate the text, said by participants in response to the question above, on which the code ‘helped’ was applied. While ‘helped’ is used in the thesis, line 5 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that they became motivated to learn the next computer programming course in the sequence of computer programming courses or that their achievement striving to learn the next course was helped.

[Participant 2]

R: I will succeed in them because I will study more for them / I found out the way to study for them from CSC 216 and it extended for CSC 217 and CSC 417

[Participant 3]

R: They motivated me to work more

[Participant 6]

R: I was interested in just passing the course and I felt that I had enough of logic and syntax to pass any course in programming

[Participant 9]

R: Yes, it helped me.

[Participant 12]

R: God willing, if I continue with this pattern, the grade will be higher.

[Participant 15]

R: I wanted to take computer programming 2 and I wanted to learn more / after passing programming 1, I was happy with the course and I was engaged in the logic of computer programming and liked it very much and I liked to learn more

[Participant 17]

R: It was a good grade with respect to a programming course, that I am going to use in all my major, thus it was a good kick off / I said that I am capable of doing well in my major / this course belongs to a sequence of important courses

Sub-theme: achievement striving - achievement striving hindered

Below are extracts, each from a different source file, that illustrate the text, said by participants in response to the question above, on which the code 'hindered' was applied. While 'hindered' is used in the thesis, line 6 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch. All participants below said that they were not motivated to learn the next computer programming course in the sequence of computer programming courses or that their achievement striving to learn the next course was hindered.

[Participant 5]

R: This affected my motivation negatively

[Participant 8]

R: I started to think of changing my major / if it is an entry level course and I am not achieving well, so what was waiting for me on the contract sheet? / the coming courses might be more difficult or easier / in either case I do not want to go through the same experience, I will either leave the university or I am obliged to understand the material which was difficult

[Participant 11]

R: there is no way that I continue in programming

[Participant 21]

R: I realized that I will be repeating every course 3 to 4 times to pass it / I am working and I cannot afford repeating my courses, consequently I changed my major

Sub-theme: controllability – affection

According to the attribution theory, the controllability dimension has affective psychological consequences which are guilt, anger, shame gratitude, and pity. Below are extracts from source files that illustrate guilt and anger.

Sub-theme: controllability – affection guilt - question asked by the researcher

Did you feel guilty?

Sub-theme: controllability – affection guilt

Looking at what each of the participants said in response to the question above led the researcher to create two Controllability Affection codes 'guilt' and 'no guilt' which reflected two emergent sub-themes in what students had said to him during their interviews. Below is an extract that illustrates the text, said by a participant in response to the question above, on which the code 'guilt' was applied. While 'guilt' is used in the thesis, line 59 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch.

[Participant 8]

R: Of course, I felt guilty / first of all, I am losing my money / secondly, I thought that business computing as a major was different than this, easier / I did not expect what I faced / of course I had a feeling of guilt, I lost my money and my time

Q: How did this feeling of guilt affect your motivation to study for the course a second time?

R: It motivated me. (This was coded as 'Feeling guilt cause 1 increased motivation', see line 101 in Appendix E)

Below is an extract that illustrates the text, said by a participant in response to the question above, on which the code 'no guilt' was applied. While 'no guilt' is used

in the thesis, line 62 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch.

[Participant 24]

R: No, because it was out of my hands. I had to find a job and work.

Q: How did this feeling of guilt affect your motivation to study for the course a second time?

R: No, No. (This was coded as 'Feeling guilt non-existent cause 1 not affected motivation', see line 103 in Appendix E)

Sub-theme: controllability – affection anger- question asked by the researcher

Did you feel angry?

Sub-theme: controllability – affection anger

Looking at what each of the participants said in response to the question above led the researcher to create two Controllability Affection codes 'anger' and 'no anger' which reflected two emergent sub-themes in what students had said to him during their interviews. Below are two extracts, from two source files, that illustrate the text, said by a participant in response to the question above, on which the code 'anger' was applied. While 'anger' is used in the thesis, line 57 in Appendix E shows the code that represented it in the Code List Editor of HyperResearch.

[Participant 5]

R: I felt angry at the teacher.

Q: How did this feeling of anger affect your motivation to study for the next course?

R: This lowered my motivation. (This was coded as 'Feeling anger cause 1 decreased motivation', see line 92 in Appendix E)

[Participant 41]

R: Yes, because I could have been in control. When I look back at the material, I realize that I was able to do well in it, but I was going through circumstances that hinder me from doing well, this made me angry the most, that I was able to do well but I could not because of time only

Q: How did this feeling of anger affect your motivation to study for the next course?

R: It motivated me (This was coded as ‘Feeling anger cause 1 increased motivation’, see line 94 in Appendix E)

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