Perceptions of students who participated in business simulation at Umeå School of Business, Sweden

A model for educational simulations

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Abstract:

**Purpose:** The goal of this study is to emphasize the use of business simulation as a learning tool in educational institutions. For instance, the two master’s programs (marketing & entrepreneurship, provided by Umeå Business School at master’s level), comprised of four core courses each, but only one module out the four provided utilized simulation for learning purpose. Generally self study, class lectures and case studies are used as the main pedagogy tools in the class room setting. In case of Umeå Business School, the use of simulations and gaming was rather limited in Umea School of Business (USBE) despite the fact that simulations are used to the point of saturation in American universities. This research is focused towards exploring the perceptions of students who undertook a business simulation at Umeå Business School, Sweden. Furthermore, it also provides a model for an effective simulation from educational point of view.

**Method:** Hypotheses were developed to investigate the perceptions held by the students at USBE regarding their perceived effectiveness of simulation as a learning tool. A deductive approach was followed by using theories and scientific research by which hypotheses were generated and tested for answering the literature gaps. Quantitative research strategy was used and questionnaires were sent only to qualified respondents (those students of USBE who had already taken simulation at least once in any modules of their study tenure). Hypotheses were generated to find out correlations between the variables and tested through Pearson coefficient using SPSS testing methods.

**Findings/conclusion:** The findings revealed that students consider simulation the most learning tool compared to others. Simulation is considered practical learning, learning through a gaming approach, an exercise that replicates realistic environment in class room. It provides an enjoyable way of learning and the retention of learnt concept is in high to medium range.

- Empirical findings show that there is a positive correlation between the variable students who would like to use simulation again with the variable that students will register a course which provides simulation.
- There is a strong positive correlation among variable of perceiving simulation as exciting and variable perceiving it as a fun way of learning.
- Positive correlation exists among variables of being excited to know of simulation in a course and variable of considering simulation being a learning experience.
- Lastly we found that there is positive and highest correlation in perception of students regarding likeness and learning with regards to simulation. This means that compared to other tools there is more likeness of simulation amongst students and they perceive it as most learning tool compared to class lectures, guest lectures, self study and group discussions.

The study concluded with providing a basic model of an effective simulation which was developed in line with literature review and empirical findings from this research.

**Keywords:** Simulation, Effective simulation model, Perception, Pedagogy tools
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1. Introduction:

1.1. Background:
Master of Science in Business Development and Internationalization is a master’s program offered to the student at the Umeå University’s Business School (USBE). As of academic year 2011-2012 the program comprises of four core modules namely Strategic Foresight and Innovation, Entrepreneurship and Business Growth, Managing Networks and Internationalization and lastly Business Development Analysis. These core modules are taught by lecturers and professors who have at least over 10 years of teaching experience in fields relating to business, research and entrepreneurship. The mode of educating the students is aided primarily by three main sources. The first and most dominant mode was with the help of class lectures covering the chapters of the prescribed and followed module book. The second mode comprised the study of published articles and case studies. Lastly but equally important was the knowledge delivery through guest lecturers working in the industry who shared their practical experiences and thoughts relating to the topic covered in the lectures.

While independent study of the book, articles, class lectures and case studies were the main mode of learning for the students, the practice of introducing simulations and gaming was rather limited. For instance in case of the master’s programs (marketing, management, finance, accounting and entrepreneurship) offered by Umeå Business School, which comprised of four core modules each, only two programs offered some kind of simulation opportunity in only one of the four core modules which were the part of the semester.

It became very evident to the writers of this thesis that there is generally a lack of balance in utilization of gaming and simulation techniques for education purpose at Umeå Business School. According to AACSB (Association to Advance Collegiate Schools of Business) in American schools and universities simulation has reached a point of saturation for its use in the curriculum. Interestingly the scope of simulation in education remains extinct in the Scandinavian region which is reflected by the fact that scientific articles on the subject of simulation in education are a rare commodity to find. The most abundantly available resources on research regarding the role of simulation in education are available in context with studies conducted in America and Australia. However, similar studies from Swedish or Scandinavian business schools are not available which could relate to the study of perceptions of students who undertook a simulation during their university education. Most of the contribution to the simulation literature in shape of articles is from American schools.

We have identified three research gaps, and these three research gaps will serve as the foundation for this study.

First, in general, there are very few studies made on the subject of the use of simulation in education. Most studies are also made in an North American context, there is therefore a need for more empirical studies from other geographical areas of the world.

Secondly, literature does not exist which provides a basic model for simulation to be effective for university education and how the model could be used to improve or design simulations for the students.

Finally, there are no research studies that provides an insight in the relationship between the variables 1) Likeness and repeat use of simulation. 2) Excitement and learning experience. 3)
Likeness of simulation and its relation to learning from the use of simulation. These research gaps will be discussed in detail in the literature review chapter.

Considering that there are cultural dissimilarities amongst countries, this study takes a perspective from a Swedish university. It would be interesting to know the perceptions carried by students here regarding the use of simulation as an educational tool.

According to Tunstall & Lynch (2010, p.626) in the conventional setting of university education the most widely used medium to introduce real-world events come from case studies. However in our opinion case studies are static snapshots. They lack the fluidness for the student to experience the consequences of any action taken with respect to responding to that real world situation.

The role of simulations in education dates back to early 1950’s when the American business schools were in the forefront of promoting and adopting simulation techniques (Faria, 1998). In order to understand what simulation is, a definition was provided by Qayumi “Simulation is the implementation of a model over time. Therefore, we can say that simulation brings a model to life and shows how a particular subject or phenomenon will behave (Qayumi, 2010, p.265).” Simulation is the way of increasing capability to understand the interpersonal behavior, problem solving as well as research and teaching (Klein & Fleck, 1990, p.147).

The work of Faria is considered the most exhaustive research into the subject of simulation learning in American business schools. It is a collection of most extensive research covering almost 1700 business schools where around 200 simulations were being used in different subjects. Building upon the work of Faria, some advantages of simulations were explored by Fripp (1997). These advantages will be further elaborated in the following text.

Fripp (1997) describes that simulation provides motivation in the sense that it is the most enjoyable means of education. It creates interest at the time of learning. It encourages team work since at the time of simulation practice; different people work in different core areas which enhance team working skills and also serve as a medium for exercising group dynamics. It provides a risk free environment considering the perspectives of either individual or the organizations risks involved in decision making can be tested without actually taking the risk. Simulations encourage the users to experiment with options without any fear of failure that may have posed significant threat if tested during real circumstances. It provides variety for learning through experimentation in different areas such as sales, distribution, marketing planning, plant operations etc. It proves experiential learning i.e. provides experiences in term of feedback of decision making that enhances more learning capability. Finally the development of simulation programs have become very attractive, interactive and realistic with the inclusion of high speed networks and graphics ability as well as user friendly nature.

The scope of using simulation techniques in education is more common in health care education compared to the use in business education. According to Qayumi (2010, p. 265) the American College of Surgeons (ACS) was the first organization in the health care that understood the value of education through a simulation based approach. Using simulations for education are now integral part of the medical education. However, acceptance for the use of simulations in business studies is still very limited. Whereas, Qayumi (2010, p.265) regards simulation becoming an important part of the education.
Using simulations in education has more advantages than disadvantages. Studies conducted by various authors such as (Miller & Webb, 1994; Jenkins, 1998; Keys, Fulmer & Stump, 1996; McKeachie, 1986; Alpert, 1993; Ebner & Holzinger, 2007; Kumar & Sherwood, 2007; Randel, Morris, Wetzel, & Whitehill, 1992; Storrs & Inderbitzin, 2006; Moratis & Hoff, 2006) and many others provide evidence on the effectiveness of simulation as a mode of education. According to Miller & Webb (1994) the conventional methods of imparting education (class lectures, discussions, case studies, etc) provide insights but lack in providing real time experience and feel of the actual processes and activities. Whereas Jenkins (1998) states that the development of simulation present now a day has been a three phased journey. The use of simulation has become more common and even more productive. The opinion of Keys et al.(1996) is that case studies alone are not sufficient and empirical findings of their study show that a combination of case studies and simulations are the most productive means of imparting education. The prime benefit according to McKeachie (1986) of using simulation is that it provides the users an active participation in both learning and group interactions. Furthermore, Alpert (1993) proposes that large scale simulations provide benefits to the students in terms of utilization of interpersonal communication skills, relationship management skill, holistic and strategic thinking under ambiguity, self reliance, computer literacy, comprehending of comprehensive and realistic marketing issues and creativity with the element of risk taking.

Considering these advantages and disadvantages of using simulation in a module, it is also important to judge at what stage or time the simulation will be most fruitful with respect to its use. In a study conducted by Ebner & Holzinger (2007) it was stated that during the starting days of a course students are highly motivated towards learning but gradually this interest tends to decline and simulation is therefore a method to keep the motivation stable. Furthermore, the motivation towards learning and interest in a module can be maintained if the simulation is provided during regular intervals covering the entire span of the module compared to being introduced at the very end.

A research conducted by Kumar & Sherwood (2007) shows that simulations are responsible for gains in student’s conceptual understanding and application compared to other forms of education. Similarly Randel et al. (1992) concluded that the retention of materials covered through simulation is greater than the retention from conventional class room setting. Storrs & Inderbitzin (2006) believe that generally a student learning is dominated by conventional class room method of attaining knowledge which in their view is not the most effective way of learning. A research conducted by Moratis & Hoff (2006) at a university in Netherlands showed simulation an effective learning tool which was appreciated by both teachers and students. This is one of the many reasons of wide spread use of simulations in American universities.

An assessment of learning from various methods was provided by (NDT Resource Center, 2011) and it points out that the average percentage retention through the use of multiple learning methods. According to NDT study class lectures account for the least retention (5%), reading (10%), audiovisual (20%), demonstration (30%), discussion Group (50%), practice by doing (75%), teaching others / immediate use of learning (90%). Considering these figures, practice by doing can be replicated by a simulation practice in class room setting. The figures support that learning and retention is greatest via this mode, hence the importance of including simulation in education cannot be denied.
1.2. Research Objective:
The researchers had an opportunity to take a simulation in one of the core modules offered by Umeå business school. The time allocated to this activity compared to other teaching methods was only seven hours. Students who took the simulation considered it a good learning experience. One possible reason for student appreciation was due to the fact that simulation brought a change to the conventional mode of study.

The research objective is to provide a study which is from the Swedish perspective since a lot of studies have been conducted in American and Australian business schools on the topic of simulation in education and perceptions of students who undertook it. However, such studies from Swedish or even Scandinavian perspective are not available.

1.3. Research Purpose and Research Questions:

- The purpose of this research is to develop a basic model that could guide teachers for emphasising on points that can help in enhancing the learning experience of students. This model will be formulated by using research done by various researchers and will also incorporate empirical findings derived from empirical analysis.

The research question is:

- How should we understand the role of business simulation in learning at the business school with respect to the perceptions of students at USBE who undertook simulation in a module for learning?

1.4. Contribution:
This study has both theoretical and practical contribution. The theoretical contribution exists in the form of development of a basic model for an effective simulation which is an addition to the literature. The model is developed on the basis of previous studies and empirical findings collected through the survey from our study.

Furthermore, on the theoretical side this study contributes by providing the knowledge what business simulation is, how it has evolved over time, how it has been used historically for the purpose of education, whether it is effective to use simulation for imparting education by the teachers, experiences of use of simulation in business schools active in different countries.

The practical contribution of this study is that it specifically provides answers relating to what were the perceptions of students who undertook a simulation at Umeå School of Business (USBE). It also provides the perceptions held by students regarding what is the value of using simulation as a mode of education. From teaching perspective teachers can use the findings of this empirical study and the proposed model to design modules keeping in view the perceptions of students. This contribution will allow the teacher to utilize the benefits of simulation and to provide students a better learning experience.

This study, considered from both theoretical and practical sides can be used to motivate the use of simulations in business education by exploring the advantages and issues of incorporating simulations as part of module development at university level.
1.5. Limitations of the study:
The major limitation of the study is the scope which is limited to USBE considering time, financial and geographical constraints:

- The focus of the study remains the Entrepreneurship & Marketing departments at USBE and the student sample taken for the study belongs to the Master’s level program provided by these departments.

- There are many computer based simulation/games which are being used in the different business schools throughout the globe and also at USBE. However, this paper neither attempts to nor suggests any simulation or criticizes the simulations currently under use at any university.

- Another limitation is that the study is not longitudinal in nature. A longitudinal study on this topic could help in assessing the perceptions held by students regarding simulations. The perceptions of students may change over time when they use simulations more frequently.

1.6. Glossary:
1.6.1. NDT Resource Center:
Nondestructive Testing (NDT) resource centre is an organization that works and assures the functional and cost reliability of structural component and systems. The NDT resource centre also manages educational materials for the universities and colleges’ students. These materials are generally used as reference materials as well as working tools.

1.6.2. RAND Corporation:
As a nonprofit organization RAND Corporation has been working on helping in improving policy and decision making by high quality research and analysis for 60 years. Various social issues are being considered by RAND Corporation such as education, laws and business, health etc. Since many years, this organization has been engaged in developing analytical tools as well as creation of knowledge and providing solution of the problem to the clients.

1.6.3. BRANDMAPS:
BRANDMAPS is one of the examples in computer simulation. Mostly market processes simulations model emphasize on market segments and brand equity along with decision making in marketing-mix i.e. 4Ps (Moore, 1998).

1.6.4. ABSEL (Association for business simulation and experiential learning):
As an organization ABSEL (Association for business simulation and experiential learning) has vital role regarding professional developing, promoting effective teaching method and businesses. Experts, simulation designer, games and techniques of experiential study are also connected with it. ABSEL conducts annually conference where members come for exchanging their information regarding simulation and gaming.
1.6.5. **AACSB (Association to Advance Collegiate Schools of Business):**

AACSB (Association to Advance Collegiate Schools of Business) is also a nonprofit organization that was established in 1916. Some educational institutions, business and other advanced management educational organization are working with this as members. This institution is also engaged to provide goods and services to the clients regarding improvement of their entities. AACSB international generally conducts seminars, conferences, webinars, exhibition as well as issuing publications as product and services.
2. Theoretical and Practical Methodology

2.1. Introduction:
This chapter will discuss the methodology and philosophy that was followed in completion of this study. The philosophy of the research and strategy equips the researcher with the knowledge for development of the study and aids in finding outcomes in a structured manner. The chapter will also describe the methods’ and answer the questions as to for example why a particular method was selected, strategy for data collection and selection of research design for this particular study. This chapter is described by table 2.1.

<table>
<thead>
<tr>
<th>Epistemological consideration</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deductive; testing of theory</td>
<td>Natural science model, in particular positivism</td>
<td>Inductive; generation of theory</td>
</tr>
<tr>
<td>Objectivism</td>
<td>Constructivism</td>
<td></td>
</tr>
</tbody>
</table>

Source: Bryman & Bell, 2007, p-28

This study is predominantly based on quantitative analysis as highlighted in table 2.1. However, some open ended questions were also used which makes a small part of the work qualitative. Qualitative analyses come in the domain of constructivism approach of the ontological consideration. Majority of the questions asked in our survey were close ended. Using open ended questions we took opinions from the respondents. These opinions were gathered categorically and have been discussed in chapter four.

2.2. Research Philosophy:
The research philosophy is an important consideration for answering the research question. There are two research philosophies which are considered for developing an appropriate research design; one concerns the ontological orientation and the other concerns the epistemological orientation. In this portion of methodology, it is important to discuss the theoretical aspects first in detail about both philosophies which could develop knowledge about those typical terminologies for the reader.

Ontological orientation discusses the social context where the world and human nature are considered in subjective manner. It addresses question like what can we know about the nature of the world. Ontological orientation is further divided into two parts; one is objectivism and the second is constructivism. Firstly, Objectivism as an ontological position can be described with “social phenomena” and its actual meanings have an existence whereas a social phenomenon concerns every day activities. We can take an example that cultures and
sub-cultures can be viewed where people exist with their social activity like norms, value and customs. Secondly constructionism/constructivism refers those efforts which are continuously accomplished by actors for social phenomenon and their meanings have an existence, which does not exist there (Bryman & Bell, 2007, p. 22-23).

Epistemology orientation discusses the knowledge, knowing and belief. It concerns some questions that refer the knowledge such as what is or should be; how the knowledge is acquired and what we know? By considering these questions, acceptable knowledge can be generated that and an understanding if or not social world could be studied using the same principles of natural sciences (Bryman & Bell, 2007, p. 16). Epistemology has also divided into two parts that is positivism and interpretivism. Positivism supports the application of the method of the natural sciences for the study of social reality and beyond. The theory of the positivism’s function is to generate the hypothesis and then to test it. On the other hand interpretivism is considered as opposite or alternative of positivism where the scientists focus on subjective manner of social action. Moreover interpretivism put emphasis on explanation and understanding of the human behaviour that is mainly the part of the social sciences (Bryman & Bell, 2007, p. 18-19).

In case of this study we cannot define ourselves as being at the far side of the continuum being either purely objectivists or constructivists. Objectivism and positivism are considered as an ontological and epistemological consideration respectively. This study also connects with constructivism to a very small extent in a sense that three open ended questions were used for the analysis. Furthermore, we used five theories (will be discussed in later paragraphs) that connects to learning and simulation and some of the theories take an objectivist approach while some are more constructivist.

We are objectivists because the analysis of gathered information will lead us to objective and conclusive results of the social phenomena in our study. The social phenomenon relevant for this study is the most widely used traditional tools of pedagogy that are used in today’s education. Our research studied the perception of students who undertook simulation. The study also analysed previously available literature to create some basis for simulation to be introduced in to the main stream pedagogy tools. The results from literature review and findings from our research indorse the effectiveness of simulation as a very useful pedagogy tool. As an ontological consideration our study also follows constructivism to a small extent because by using open ended questions we are studying the opinions of respondents as in a social phenomenon perspective and their views have an existence regarding implications with simulation.

In this regard we designed questionnaire where we used both closed ended and open ended questions. Few open ended questions were included and opinions were taken from students as a task. This opinion collection and its interpretation indicate constructivism. On the other hand the reason of positivism is that we investigate the perception of simulation among students who undertook a simulation in education at USBE where we focused our research on getting the knowledge about simulation by generating hypothesis and testing the theory in term of social reality and beyond with consideration to simulation in education.

2.3. Research Approach:
A researcher generally collects data for answering the research question. In this regard different philosophies are available and the researcher adopts one which suits his study. On the basis of selected philosophy, suitable methods are selected for collecting interpreting and reporting the findings in the study.
Generally research is based either on deductive or an inductive approach. A deductive approach creates relation between theory and research. In this approach, hypotheses are deduced and by using empirical observation theory is tested for deriving outcomes. In testing; hypothesis is confirmed when findings could prove hypothesis. In contrast hypothesis is rejected when findings could not prove hypothesis (Bryman & Bell, 2007, p. 11). In our paper a deductive approach is most suitable because we are collecting a lot of empirical data by questionnaire and deducing hypothesis that will definitely test the results and establish the relation between theory and research.

**Deductive Approach:**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Deduction process</th>
<th>Action by authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Theory</td>
<td>The theories used in this research are based from scientific articles and from university website which carry authenticity as means of secondary sources.</td>
</tr>
<tr>
<td>2</td>
<td>Hypothesis</td>
<td>Hypotheses were generated on the basis of theory and literature review.</td>
</tr>
<tr>
<td>3</td>
<td>Data collection</td>
<td>Primary data was collected from students through questionnaire and secondary through scientific articles.</td>
</tr>
<tr>
<td>4</td>
<td>Findings</td>
<td>Empirical results were found from those specific students who have done simulation once in module and reported in chapter 4.</td>
</tr>
<tr>
<td>5</td>
<td>Hypothesis confirmed or rejected</td>
<td>Hypotheses confirmation and rejection is based on Pearson testing method by using SPSS and at significance levels of 95 and 99%.</td>
</tr>
<tr>
<td>6</td>
<td>Revision of theory</td>
<td>Conclusion is based on empirical findings and their analysis.</td>
</tr>
</tbody>
</table>

![Figure 2.1 The deduction process Source: Bryman & Bell, 2007, p-11](image)

### 2.4. Research strategy:

In research papers, two methods are widely applied by the researchers as strategy namely quantitative and qualitative means of data collection which differs in many ways from each other as illustrated by (Kekäle, Weerd-Nederhof, Cervai, & Borelli, 2009).

In research strategy, quantitative researches are designed on the basis of quantification collection and analysis of data; some other details are elaborated as follows:

- It necessitates deductive approach that emphasizes testing the theories. It connects practice / norms with natural science model and positivism particularly. It represents social and objective reality. Here hypothesis are generated and tested by statistical tools.

A qualitative research strategy is used to analyze opinions and thoughts rather than numbers or quantities. This approach studies a theory and develops it further by contributing to the
previous theory using the process of induction. This strategy represents social reality. In this strategy research questions are generated to further build on the existing theory.

2.5. Research design:
Five different types of research designs are generally considered for research purpose; experimental, cross-sectional design or social survey, longitudinal, case study, and comparative designs. These designs have also subsections as variations which are considered according to situation of the research paper (Bryman & Bell, 2007, p. 44). The nature of our empirical research is social survey where data is collected in consideration of quantitative or quantifiable data for the purpose of one single point in time. This pathway denotes cross-sectional or social survey design (Bryman & Bell, 2007, p. 55). In this type of survey, collecting data depends on more than one case where some variations are involved such as an organization, nation states or people. Our paper focuses to collect the data by opting surveys which would be quantifiable of our research questions and hypotheses.

2.6. Data Collection:
Data collection is the process of gathering information from various sources which help in answering the research questions, as well as testing the hypotheses developed by the researchers. There are two types of data, primary and secondary. Primary data is collected by the researcher for the first time use whereas secondary data is available which the researcher uses to analyze or base his/her research on.

Primary information sources are those original information sources that are congregated from social survey (questionnaires & interviews), experiments, and observations. On the other hand secondary data sources are those which are used in the paper from others’ contributed information. Secondary data information sources are collected from books, articles, journals, information from web which is relevant to the subject of the paper (Ghauri & Gronhaug, 2005, p. 90-103). For this research secondary data was from the scientific articles and theories pertaining to learning discussed in detail in literature review chapter. These theories include Jerome Bruner’s constructivist theory; problem based learning approach, multiple intelligences, transfer of learning and cognitive load theory. The relevance of these theories as how they can help in understanding simulations and the use of simulations in education has been discussed in detail in chapter three.

In our paper we focused on quantitative research strategy. In this regard we collected data through survey questionnaire and analyzed the data with the aid of SPSS (Statistical Package for the Social Sciences, software for statistical analysis). The questionnaires were sent to 120 students of both marketing and entrepreneurship department who undertook the offered programs within last two years i.e. (2010 and 2011). These questionnaires were sent by email from the list provided by USBE. However, as expected the response rate was very meagre i.e. only 43 responses were collected through emails. Therefore, the researchers set on the path to collect responses manually by approaching the respondents who were identified as having taken simulation. Collectively through both email and manual filling of questionnaires it was made imperative that the respondent is qualified in terms of he/she has already taken at least one simulation based module in their program.

Considering the limited time, some previous studies were also included in the analysis part which provided adequate knowledge to substantiate the validity and effectiveness of simulations for the purpose of education.
From the perspective of secondary data collection we got extensive information from sources in literature review (primarily from American and Australian perspectives) and gathered information from different scientific articles and journals. The articles used for this research were published during 1985 to 2010. We are confident that all secondary sources despite some published as early as 1985 are reasonable and fit for the purpose of our thesis. All articles and scientific journals as secondary sources of information that we used, were taken from the reliable search engine of the Umeå University’s library Business Source Premier. During our review of articles most were tracked back to the original author. However, at few instances secondary references were used because either the article was not available online or the book was not available in the Umeå university library. Furthermore, some views were taken from websites which belong to educational or organizational background and had .edu or .org extensions.

We collected primary data for empirical analyses using a questionnaire. This questionnaire was provided to only those students who had already taken simulation in at least one module. In the questionnaire we added mostly close ended questions where respondents can answer fixed alternates as an appropriate answer. In contrast few open ended questions were also included which provides expression of additional views as per respondents’ wish (Bryman & Bell, 2007, p. 258-59). Because of greater focus towards quantitative research we tested the data by the statistical tool of SPSS which helped us making decisions on accepting-rejecting of hypotheses. The open ended questions were focused on collecting views regarding good and bad things students perceive about simulations. The responses collected were narrowed down to certain categories and used for interpretation. These categories will be discussed in chapter four.

2.7. Questionnaire Sample Selection:
When conducting a research, especially in the case of quantitative it is important to understand the difference between population and a sample. The population refers to the total events and sample is a subset of the population. Therefore, in a sample not all elements from the population are present. Sampling refers a process, in which adequate members as elements are selected from the whole population (Sekaran, 2003, p. 265-66). In this research the sample size of the respondents is 82.

In this regard, our population was all those students who have take simulation once at least in their module such as students of Marketing and Business development & internationalization. Therefore 120 respondents were approached through email to fill a web based survey questionnaire. A total of 95 responses were collected while 43 were through email and 6 were excluded due to being incomplete. The rest of the responses were collected through physically approaching the qualified respondents. We excluded 7 responses since those students responded by mentioning that they never took any simulation.

2.8. Data Analysis:
There are three types of statistical methods which are used for analysing the empirical result namely univariate, bivariate and multivariate analysis. Univariate analysis is undertaken when only one variable is to be analyzed. In bivariate analysis two variables are analyzed at a time whether they are related to each other or not. Further multivariate analysis is used where three or more than three variables are concerned which is mostly used for analysis in advanced quantitative research (Bryman & Bell, 2007, p. 357-365). We followed univariate and bivariate technique for analysing the relationship between dependent and independent variables as per situation.
Table 2.2 shows the collection of dependent and independent variables used in this study. For instance learning in a module is dependent on the tools such as class lectures, simulations etc. We are interested in knowing the perceptions of students regarding what they think is the most learning pedagogy tool. Furthermore, which teaching tool do students like the most? Other questions that need to be answered are do students see simulation an exciting tool for learning, did students felt there was too much information load to retain for solving the simulation. Lastly according to students perception what in a simulation is the most important variable amongst enjoy ability, ease of use, realistic nature, encouragement of team work and learning. Moreover which factor is most important and which is the least important for them.

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Independent variables</th>
</tr>
</thead>
</table>
| Learning in the module is most effective through | Class lectures
| | Guest lectures
| | Group Discussion
| | Simulations
| The most liked medium of learning by Students is | Class lectures
| | Guest lectures
| | Group Discussion
| | Simulations
| Satisfaction for the use of simulation | Balance between the information provided
| | Repeat use
| | Excitement
| | Better learning compared to other modes
| Important requirement for simulation | Enjoy ability
| | Ease of use
| | Realistic
| | Encourages team work
| | Learning

Bivariat analysis was used for ascertaining the correlations in hypothesis testing. We used Pearson correlation which is a statistical tool that helps in measuring the strength and direction of relationship between two or more variables. It gives a value between the ranges of -1 to +1 demonstrated in table 2.3. It helps in ascertaining the dependence between the variables. The Pearson correlation value is denoted by ‘r’ and the value +1 and −1 means a strong correlation of variables in the same direction and a weak correlation in the opposite direction respectively. The value if 0 means there is absolutely no relation between the variables.
Table 2.3 Nature and Ranges of Pearson Correlation

<table>
<thead>
<tr>
<th>Correlation is</th>
<th>Between the values if Pearson r lies in the range of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>0 - .30</td>
</tr>
<tr>
<td>Moderate</td>
<td>-.30 - .70</td>
</tr>
<tr>
<td>Strong</td>
<td>.70 - 1</td>
</tr>
</tbody>
</table>

The following table 2.4 provides the explanation for the correlation tests that will be done for hypothesis testing. This table is a sample output produced by the analysis of variables when processed through the SPSS software. For the purpose of easy understanding and focusing on the important results we have highlighted certain values.

Table 2.4 Correlations between simulation motivation and repeat use of simulation

<table>
<thead>
<tr>
<th>Simulations provide motivation for module registration</th>
<th>Would you like to use simulation again</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.355**</td>
</tr>
<tr>
<td>N</td>
<td>82</td>
</tr>
<tr>
<td>Would you like to use simulation again</td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.355**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.001</td>
</tr>
<tr>
<td>N</td>
<td>82</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

The value 0.355 shows the strength of the correlation between the variables. Here the strength of the correlation is moderate and the value is positive so it means that the variables are moderately positive related and move in the same direction.

The value 0.001 refers to the p value i.e. the significance and since this value is less than .005 hence we can reject null hypothesis $H_0$ because according to the value .001 it means that the chances of rejecting the Null hypothesis if it was correct are 1% due to sample error. It is worth mentioning that at times the value can be .000 which does not means that there is a perfect 0 chance of having no error. It simply means that the chances are less than 1% since in SPSS any value below .001 is automatically considered to be .000 since the value is negligible.

The number 82 refer to the sample size on which the descriptive statistics were done and relates to the number of cases on which this correlation calculation was done.
The findings were reported using pie charts, bar charts and tables. The simplest of the findings were expressed by pie charts which are easy to interpret at first look. Bar charts were used where there was the relation of multiple variables with a specific variable. Tables were used in instances where respondent agreement-disagreement was measured. The factors which were most important to report and used in the analyses are highlighted for easy understanding of the reader.

For the analyses of ranking questions the respondents were asked to rank their opinion from a scale of 1 to 5 where 1 being the most preferred option and 5 the least. These rankings were converted into meaningful information by allocating 5 point to rank 1, 4 points to rank 2, 3 points to rank 3, 2 points to rank 4 and 1 point to rank 5. Therefore the summation of the points was used to make charts and other analysis.

2.9. Reliability and Validity in research:
Reliability and validity are two important considerations for a research. These concepts are easily mistaken when developing an understanding. The following paragraphs will discuss these concepts in detail.

- **Stability**: stability denotes the confidence of researcher that result of the measure of the respondents’ sample remain stable and no fluctuation should occur. In other words if we manage a test of a group on one occasion and measure it again at another juncture of time than little variation should occur. The sample stability would be in the sense that our sample included 80% respondents who took simulation at least once. The perceptions of these students are based on their exposure to at least one simulation. Considering if the same sample is tested again the results will be stable since to have a shift in perception the students would need to undertake multiple simulations. Therefore if this specific sample undertakes more simulations in the future then there are chances that perception may change slightly but overall there would be little change in the stability of this research with little variation.

Moreover we can say with authority that after extensive literature review and studies conducted by various authors, the variables studied for the perception analyses were covered by many studies in the past. The variables are most common and have been studied at different levels. The result from our study also reflects and conforms to the results from the previous studies to a great extent. We are confident that even if the sample or population of the respondents will be changed over time the results would be almost similar with slight differences provided the research is done on a controlled sample i.e. students who have already taken simulation in bachelors or masters level education.

- **Internal reliability**: is the measure of consistency of a measuring instrument when it is used multiple times under the same conditions. It is measured by grouping questions which measure the same concept. There are many different aspects of reliability one of the main issues is the internal consistency in the scale. Cronbach’s Alpha is a measure of internal consistency for finding the relation between the variables in a scale. The Cronbach’s Alpha coefficient of a scale should be above 0.7 (Pallant, 2007, p. 95). For this study the Cronbach’s alpha values generated by SPSS for the scales regarding measuring motivation and learning from simulations are as follows.
In short we can see that the values of Cronbach’s Alpha coefficient are 0.798 and 0.727. According to Pallant (2007, p. 95) ideally the value should be above 0.7 which is considered acceptable for social sciences. Therefore our scales are reliable and show high internal consistency.

Secondly, validity means “the issue of authenticity of the cause-and-effect relationship (internal validity), and their generalizability to the external environment (external validity) (Sekaran, 2003, p. 206)”. According to positivist approach, validity means which instruments of measurement are to be used for measuring (Bryman & Bell, 2007, p. 164). In term of quantitative study, validity is that findings or results are the same as, what are really in the world (Creswell & Miller, 2000).

This survey was sent to only those students who have taken simulation based module in their program at least once. This way of data collection is valid according to (Creswell and Miller, 2000). In this study we tried to collect the data by using different ways (empirical and previous disperse studies on the subject) that off-module indicates the validity of study. These different sources of information can derive better conclusion and make this study more credible and valid.

2.10. Ethical Consideration:
This portion of the chapter refers to a code of conduct where the researchers follow the rule and regulation. This code of conduct generally applies to the organization, members, researchers who conduct the research, respondent or participant from whom data was collected as well as analyst and entire research team who provide conclusion and suggest better solutions (Sekaran, 2003, p. 17-18). As the issues regarding ethical consideration addresses following questions;

- The activities, where we should engage or not / should we relate of the or not?
- How can we connect or treat the respondents or who could be a part of our research? (Bryman & Bell, 2007, p. 127)

This study was quantitative research and we collected primary data on the subject of perceptions held by students who undertook business simulation. As a responsibility and obligation we admitted and followed the high ethical standards in the whole process of the study as well as concentrated not to break the rules pertaining to the ethical consideration. The respondents were emailed only once and then a soft reminder was sent in case they have forgotten to respond. The questionnaires which were filled by physically approaching the respondents were administered after confirming the respondents will to participate and that
they were willing to spare some time for answering the questions. After completing the forms
the researchers thanked and appreciated the respondents for their cooperation in the process of
data collection. Since we covered ethical and moral grounds this research shows integrity and
conforms to the ethical requirements as present in (Bryman & Bell, 2007, p.132-134). All
results were shared honestly and responsibly without subjecting them to researcher bias. In
our study we also used some articles, journals, books and other sources that were cited and
referenced properly due to avoidance of plagiarism. Furthermore, all confidential issues of the
respondents like their names, e-mail and other profiles had been strictly withheld in order to
maintain respondent secrecy. After much review of ethical considerations provided by
Bryman & Bell, we as researchers understood and fully adhered to ethical practices to collect
data from respondents and reporting without personal bias.
3. Theoretical frame of reference and Literature Review:

This chapter will focus on introducing the reader to the subject of simulation, its evolution, the types of simulations, and to different areas of education where simulation is used. It will discuss the validity of simulation for the purpose of use in education, how simulations play a role in businesses, elaboration of the use of simulation in education. Furthermore, the chapter will discuss the effectiveness of simulation as a tool in education delivery and extracts from previous studies regarding student perceptions of undertaking the simulations.

This chapter also includes the discussion on grounded theories of learning and how they are applicable for the purpose of generating support for the use of simulation in education.

3.1. What is simulation?

“Simulation is the implementation of a model over time. Therefore, we can say that simulation brings a model to life and shows how a particular subject or phenomenon will behave (Qayumi, 2010, p.265)”. Simulation is the way of increasing capability to understand the interpersonal behavior, problem solving as well as research and teaching (Klein & Fleck, 1990, p.147).

The prime goal of the simulation is to achieve greater learning. A simulation to achieve its goals, must consider that it appropriately links the requirements of encouraging team work, decision making and analytical skills. Figure 3.1 illustrates the idea that to achieve the goal all three requirements must meet adequately.

![Figure 3.1 Goals of a simulation](image)

Here it is worthwhile to understand the difference between a simulation and a game. The major difference between a simulation and a game defined by Aldrich (2009, p.1) is that while games tend to involve the user for the sole purpose of providing entertainment, they empower the gamer to experience exposure to a given set of tools, motions, or ideas. Furthermore, Landsberger (2004) in order to understand the difference between game and simulation, conducted an interview with Dr. Kurt Squire (who is an assistant professor in educational communications and technology at the University of Wisconsin at Madison and a visiting research fellow at MIT). Dr Squire explained the difference by answering that a game is an extension of the simulation. In his opinion games are interesting simulations.

Whether students ultimately consider this approach a simulation or a game, it would be interesting to know if there is any relationship between students excitement (to have a simulation based approach for learning) with regards to considering it as a fun way of learning. The literature does indicate that there is positive correlation between the variables perception of excitement and perception of it being fun but literature does not provide the nature of strength between these variables. We think that the nature of correlation should lie...
in moderate range of Pearson coefficient i.e. (moderate 0.3 to 0.69 range). Therefore, the following hypothesis was developed to inspect the positive strength of correlation between the variable.

**Hypothesis 1:**
Students who find a simulation to be exciting part of the module perceive it as a fun way of learning.

\[ H_0: \text{There is not a moderate positive correlation among variables of perceiving simulation as exciting and perceiving it as a fun way of learning.} \]

\[ H_1: \text{There is moderate positive correlation among variables of perceiving simulation as exciting and perceiving it as a fun way of learning.} \]

The early simulation games according to Jenkins (1998, p.43) existed over 5000 years ago, also Wolfe (1993, p.449) points out that simulations were being used as early as 3,000 BC in China for military training. However, Jenkins states that the use of simulation during the period of 1955 to 1985 onwards has gone through 3 major stages. The first was the “Pioneering Period” dating from 1955-1969 which was dominated by major interest of North American schools by actively using simulations. The second era also called the “Development Period” started from 1970 to 1984 showed expansion of the use of simulation across American boundaries. Lastly the period from 1985 and onwards is titled as the “High Tech Period” in which a high number of international management simulations flourished, aided by the availability of micro computers.

We can track the beginning of a formal simulation for training and educational purpose to the year 1959 where according to Jackson (1959, p.93) modern day simulation came into birth when the RAND corporation in 1955 developed an inventory management simulation exercise called Monopologs for the United States Air force to train officers as inventory managers.

Similar to the use of simulation in military, it can also be used in the field of medical education where Morgan, Doreen Cleave-Hogg, & Lam-Mcculloch (2006) points out that due to increasing patient safety requirements, students in the medical education have difficulty in relating theories without direct application on the patient. Since these are novice doctors, the concern for patient safety becomes more important. Here the gap is filled by using simulation techniques to replicate real life bodies.

Different simulations are required for different purposes considering the wide span of their applicability. Therefore, it is important to distinguish amongst simulations. Simulations can broadly be divided in two types depending on the purpose they serve.

**3.1.1. Types of simulation:**
There are two types of simulations. First there is the custom type of simulation that is used for a specific purpose and is considered as ideal for training in specific products. Second there is the evolved simulation that is used for all businesses in broader way, by which strategic and financial skills can be improved and it is considered a better choice (Mitchell, 2006, p.248).

From the training perspective, custom simulations have a vital role in terms of enhancing the user’s capability. This type is used for decision making in business activities. Custom simulations are made specifically according to the business requirements. For instance car
manufacturers would generally prefer to use specific insurance simulations. It means the usage of custom simulations depend on company’s specific problem.

In evolved simulation, the design is such that it incorporates all or the major processes such as business R&D, finance, competitor evaluation, inventory and supply chain etc which are the part of a single simulation (Mitchell, 2006, p.248). Evolved simulations usually cover all key areas of the company like strategic level, operation, finance, supply chain management and research and development (Mitchell, 2006, p.250).

In terms of learning capability simulations can be categorized in two parts; one is simple simulation, where few decisions are made by the individuals. Sophisticated simulations allow complicated decisions in marketing and other processes by individuals (Moore, 1998, p.552).

There is no specific right simulation type. Selecting the right type depends on the circumstance, needs and requirements, goals and objectives, scope and breadth of the subject. Therefore, if the right simulation is to be selected, the previous mentioned variables need to be addressed. This will increase the validity of the simulation to be applicable and remain realistic in reflecting the real events\ processes which are of major importance with regards to learning.

3.2. Educational Validity of Business Gaming Simulation:

For a simulation to be valid to provide for the purpose of learning and knowledge transfer, the design of the simulation itself plays an important role. According to Stainton, Johnson, & Borodzicz (2010, p.706-7), teaching and learning are the primary objective of the simulation gaming in term of validity which are possible by a good design of the simulation. The following two points are considered when deciding the validity of a simulation.

- The effectiveness of the design of the simulation.
- The way in which it is to be implemented considering various fields like military, medical education, business education etc.

While businesses are getting into more complex dynamics of operations, a realistic simulation designs could help students understand the phenomenon without actually experiencing it in the real world. A well designed simulation will determine the accuracy of results reflected by the actions taken. Such properties will decide the effectiveness of a simulation in learning perspective because inaccurate learning and complexity in understanding the simulation would be a time and cost consuming activity with marginal results. The design should incorporate sufficient knowledge and experience regarding all general and critical business issues to be effective in cost and learning perspective (Stainton et al., 2010, p.708).

Simulations are also used for business education, operations training and specially helpful in forecasting events that follow a certain pattern. Considering that we have established the validity of simulations from educational point of view, the role of simulation with respect to its applicability in business will be explored in later lines.

3.3. Role of simulation in Business:

Business processes are being changed or replicated (especially now a days from the environmental sustainability perspective) due to an explosion of information, research and development in studies relating to business processes and their reengineering. Moreover apart from reengineering of processes, the internationalization process is increasing as local companies venture from the home boundaries to other countries by opening subsidiaries and
investing in other regions. For employment purpose different skills are required such as skilled and non skilled labor. The organization turnover ratio is also increasing because of competitive environment. Similarly the nature of customer demand is also changing rapidly. Upstream supplier relationships are evolving. Considering these changes business simulations can provide support for training of the workforce, scenario based planning for supplier-distributor capabilities, new product development etc (Fripp, 1997).

Change in business environment cannot be altered using a simulation but it helps in forecasting the evident changes that may occur under prevailing circumstances. Simulations help business in being prepared to respond to these changes. It allows businesses to provide necessary training and management skills to the employees in case a situation occurs. Therefore such responses can be practiced through the use of simulations. Furthermore, Fripp (1997) comments that in order to counter the enormous pace of changes and the environment, simulations play an important role in planning and development of products, training of staff etc. For example sales management simulators according to Faria & Dickinson (1994) provide learning in relation with sales and customers, new product development etc.

The scope of using the simulations as a mode of training is gaining wider use in America. Faria (1998, p.303) displays that 62.2% of the respondent companies (115) use business simulation as a part of their training program, whereas rest of the percentage is not using simulation. Large firms emphasize the use of simulation much more than smaller firms.

### 3.4. Role of simulation in Education:

The use of simulation is most common in American schools. Faria (1998, p. 304) points out that about 97.5% of AACSB (Association to Advance Collegiate Schools of Business) schools in America are using at least one type of simulation. Although simulations may have reached their saturation point in the United States there is an increase in simulation adoption in various countries like Australia, United Kingdom, Hong Kong, some countries of Eastern Europe etc. Users in these countries have shown great interest in simulations by asking for local language based simulations and hence are popular learning methods in these countries.

Business simulation games have been a part of class room in universities since 1850s. “(Wolfe, 1993, p.446) says once a novel and cutting – edge teaching technology, this method’s use has reached the point of relative saturation in various American business module applications”.

Teaching through simulation is a way of pragmatic learning and is one of the widely used tools in education at least in American business schools. Learning by using simulation is considered to provide more practice of the concepts learnt and also increases confidence, motivation and efforts put into the learning process (Snow, Gehlen, & Green, 2002, p.526). While simulation provides the motivation to learn and practice the theory, current literature does not provide empirical results that students who like simulation are more prone to take courses which provide simulation. If a relation could be found out between these variables, teachers can better ascertain the population of students who would like to use simulation again and their behavior towards increased participation in specific courses which provide simulation. We assume there is a positive correlation between these variables. Therefore the following hypothesis was developed to check our assumption.
**Hypothesis 2:**

This hypothesis was developed to confirm if there is positive correlation in student perceptions who would like to use simulation again and their registering to a module which provides simulation.

- $H_0$: There is not a positive correlation for students who would like to use simulation again would register a module which provides simulation.
- $H_1$: There is a positive correlation for students who would like to use simulation again would register a module which provides simulation.

Most of the simulations are used extensively in academic fields other than management studies as concluded by (Jenkins, 1998, p.45). There are many reasons for low usage of simulations in education. Riber & Noah (2008) studied these reasons and through quantitative analysis proposed that one reason for low usage is that enjoyment reduces learning. According to these authors the students who took simulation as a game showed greater enjoyment but their overall learning capacity was interfered due to the game being too enjoyable. This interference could be one reason of low usage of simulation. However, if the simulation is designed in a manner that it does not look like a game which is possible to address then the issue is solved.

In management studies some areas which are frequently using simulations are marketing, change management, strategy development, production/operations management, and logistics. The simulations can also prove a useful tool for emphasizing team work as many a times the simulation is set in a group or team based setting against a single user setting as pointed out by Moratis & Hoff (2006, p.219).

According to Klein & Fleck (1990) simulation games are used in different ways in academic education to provide different benefits, which are as follows,

- Game increases students’ performance.
- Games are also used as research tools.
- Games increase effective learning in students.
- Games create interest and motivation.
- Games are also used in teaching as tools.

Considering these benefits of simulation it will be interesting to know the perceptions of students who undertook the simulation if they also perceive simulation to be the most effective tool for learning considering all the benefits outlined by Klein & Fleck. Therefore to investigate this point the following hypothesis was developed.

**Hypothesis 3:**

This hypothesis was developed to confirm that; do students at USBE who undertook simulation perceive simulation as the most learning tool or not?

- $H_0$: Students will not consider simulation as the most learning tool compared to others.
- $H_1$: Students will consider simulation as the most learning tool compared to others.

In a study made by Faria (2001, cited in Snow et al, 2002, p.527) she studied the progress of simulations for the past 25 years at the Association for business simulation and experiential learning (ABSEL) and concluded:
Learning from simulation/games has been more famous and motivational for the students than other learning techniques.

Experiential learning enhances the performance of the students.

Organized team efforts could find concrete and efficient result.

Another view that supports the use of simulation in education comes from Künzel & Hämmer (2007) who are of the view that, modules focus on teaching the processes rather than facts. Teaching processes through traditional media such as blackboard or PowerPoint slides is rather difficult. Compared to these traditional means of education, simulations on the other hand provide the user to experience a vibrant, near to realistic situation(s) and better understanding of the processes by manipulating different variables/concepts to experience a near to reality environment.

A simulation was analyzed by Snow et al. (2002, p.258) who concluded that the simulation they studied provided an economic scenario to the students. In this simulation the students played a pivotal role of forming teams, managing strategic planning and decision making for an organization which is competing in the global marketplace. The simulation stressed the teams to apply their knowledge for decision making and required critical response to the events in the scenario. Students practiced their learning on the basis of experiential and simulated events in which they were required to take the right decisions (Snow et al., 2002, p.528).

Keeping in view the statement form Snow et al. that the simulation stressed the application of knowledge by the students for the purpose of learning. It would be interesting to know if students at USBE who took simulation firstly perceived it as an exciting part in the module and secondly does this excitement influence their learning experience. We think there is a positive correlation between the variables. Therefore, the following hypothesis was developed.

**Hypothesis 4:**
*Students who find a simulation to be exciting part of the module perceive it as learning experience.*

\[ H_0: \text{There is not a positive correlation among variables of being excited to know about simulation in a module with perception of simulation being a learning experience.} \]

\[ H_1: \text{There is positive correlation among variables of being excited to know about simulation in a module with perception of simulation being a learning experience.} \]

There are some simulations which are attractive in enhancing international business education topics such as conflict resolution, environmental, international arbitration. Moreover multinational business simulation in business module provides significant learning of the roles of functional areas of marketing, finance, accounting etc along with comparison of operations within home office against the international sales office (Klein & Fleck, 1990, p.148).

In the software training field McElroy & Pan (2009) studied the relationship between frequencies of practice compared to the method of practice and found a positive association which showed statistically that there lies a positive relationship between these variables. The study showed that participants undertaking simulation practices more than those taking traditional methods of interactions or limited simulations. They summarized that a gaming
approach motivated the participants to undertake more practice to achieve the desired level of learning. Furthermore, the authors studied the relationship between the total time spent in completing a task with the method of practice. While the variables did not show significant difference it was observed that the participants who undertook simulation spent less time completing the task then those who undertook traditional modes.

In case of sustainability education, simulation has become an important pedagogical tool in institutions. Simulation based training (SBT) is offering an easy way for sustainability into business education curricula. In this regard Salas, Wildman, and Piccolo (2009, cited in Mark 2010, p. 556) wrote that in the management curriculum SBT is being used more frequently than others in term of innovativeness and ethical decision making. Simulation can be used in the undergraduate modules, executive education, online modules, as well as in MBA modules, but all those depend on its requirement to add value in to the module. As in developing field like sustainability, for the purpose of learning outcomes, simulation is playing a vital role in this regard. In business simulation gaming, students usually learn about business environment sustainability. For instance in the simulation competitive advantage such as profitability, sales, and stock price and different related factors are constructed for 3 to 5 years that teaches sustainability of environment to the students (Mark, 2010). The concepts covered in the simulation can also be taught without the simulation but the effectiveness of learning may suffer. The researchers are interested in knowing the perceptions of students who undertook simulation at USBE if they consider simulation a better learning tool compared to class lectures. Therefore, the following hypothesis was developed.

Hypothesis 5:
Simulation as an instructional tool motivates the student for more learning in the module compared to class lectures.

H0: Students do not perceive simulation as the most liked tool for learning compared to others tools.

H1: Students perceive simulation as the most liked tool for learning compared to others tools.

Bonk et al. (2006, cited in Tunstall & Lynch 2010, p.626) are of the view that simulations and games are one of the most likely technologies that are impacting university education. Similarly when it comes to teaching subjects related to experience then experiential pedagogy in one of the major issues in various fields of study. Now this problem could be reduced by accessibility of information technology. In this regard simulation is one of the best experiential pedagogy tools which is playing role as a bridge between practical and theoretical knowledge (Galea, 2001).

To increase the role of simulations in business schools and keeping the simulation effective, certain criteria’s needs to be considered. Likeability and usability are two criteria’s outlined by Virvou & Katsionis (2008, pp175-177) in their study. These are the major benchmarks from student’s perspective. Here likeability can be defined in terms of the experience gained by the user through the use of graphical-visual mode. While educational games provide a sophisticated and complex virtual environment, the conventional class room setting fails to adapt the environment which can be experienced through a simulation. Extending the view of Virvou & Katsionis on likeability and useability, it will be interesting to know if likeability and learning are somehow related considering the perceptions of students at USBE. Therefore, the following hypothesis was generated.
**Hypothesis 6:**
The researchers wanted to see if there is a positive relation between likenesses and learning from simulation also or not.

H<sub>0</sub>: There is *not* a positive strong correlation in perception of students regarding, likeness of simulation and learning from simulation.

H<sub>1</sub>: There is positive strong correlation in perception of students regarding, likeness of simulation and learning from simulation.

Effectively designed simulations deliver the required goals of learning. This fact was shown by Douglas, Miller, Kwansa, & Cummings (2008) who studied the perceptions of the usefulness of simulation in hospitality industry and their results showed that students felt simulation was useful for “developing planning, decision making, and analytical skills and in understanding hospitality, management, and financial management concepts (Douglas et al, 2008)”.

Considering all the positive aspects of the simulation and few potential problem areas we can judge that the benefits of using simulation in education are greater compared to the losses. The following paragraphs will explore and conclude that simulations are an effective tool in education.

### 3.5. Effectiveness of Simulations in Education:

Simulations as a learning tool not only provides a practical approach to learning but also is considered provides the means for the utilization of interpersonal communication skills, relationship management skill, holistic and strategic thinking under ambiguity, self reliance, computer literacy, comprehensive and realistic marketing issues management and creativity with the element of risk taking and others. The National Science Education Standards of America highly recommended the teaching through reality based methods.

The practical dimension of simulation can be understood by the study made by Miller & Webb (1994, cited in Jenkins 1998, p.44) in which two senior business executives shared their views regarding simulation as “Text books, lectures, tutorials and case studies provide insight and understanding, analysis and discipline. Yet something more is required to provoke the smell of the grease-paint and the roar of the crowd (Jenkins, 1998, p.44)”.

The work of Alpert (1993) divides simulation into large, medium and small simulations depending on the complexity and time allocated. Through the use of Long scale simulation Alpert concluded that around 50% to 90% of class time over the module is spent in interpersonal communication. Relationship management as a learning concept is simulated in terms of the simulation allowing students to be part of the market (amongst other groups) and form alliances or enemies in achieving their objectives. To achieve the goals of the simulation the students carve a holistic strategy to achieve the objectives with collective decision making. The process of decision making at times may be holistic or at times ambiguous with relation to the overall strategy. This decision making gives the students a feeling of self reliance or the courage to take initiatives. However, having mentioned the benefits in such simulations, issues like grading assessment and individual marking makes the job difficult for the teacher to ascertain individual learning. Another issue with such simulations is the software costs and the training material which weakens the case for using large scale simulations in education.
Simulations in isolation cannot provide all the required learning and requires the traditional tools to build the foundations by teaching the students the theories and principles in a specific module. Simulation builds up on the previously built foundation. Research conducted by Keys et al. (1996, cited in Jenkins 1998, p.44) shows that the most effective way is the combination of management cases and management simulation rather than focusing on any one. Another benefit of simulation was highlighted by Ebner & Holzinger (2007, p.885) who found that during the starting days of a module students are motivated but this gradually decreases as time passes. Introduction of simulator techniques can help maintaining the motivation level. Ebner & Holzinger (2007, p.883) in their research used pre test - post test technique on a game based approach. It resulted in increase of correct answers by the students who took the simulation when post test was conducted.

The work of Adobor & Daneshfar (2006, p.153) supports the use of simulations in education as they cite the works of (Jennings, 2002; Thompson et al., 1997; Lane, 1995) who contributed that business simulation helps students in making strategic decisions to apply the learnt theoretical concepts into practice. Simulations have the tendency to provide a setting that is the representation of reality, helping the user to apply the knowledge even if with errors in a safe and least cost manner. Moreover, simulations help personal development since it requires the user to find solution to complex management issues and improving the capability of making strategic decisions. It requires active participation from the users to solve the problem ensuring active learning. Cited by the same authors are the views of Sherrell and Burns (1982) that simulation motivates users to understand theories and principles where by increasing the self efficacy of the user. According to Jennings, (2002, p.665) simulations are better learning tool compared to case studies and most effective tool of learning. Furthermore, according to Tompson and Dass (2000, p.22) simulations as more significant tool compared to case studies in improving the student’s self-efficacy.

Simulations also help the students in exercising skills other than just financial and market analysis. In a study made by McKeachie (1986, cited in Alpert 1993, p. 31) the prime benefits of using simulation is that it provides the users an active participation. According to Alpert large scale simulations provide benefits to the students in terms of utilization of interpersonal communication skills, relationship management skill, holistic and strategic thinking under ambiguity, self reliance, computer literacy, comprehensive and realistic marketing issues and creativity with the element of risk taking. However, the issues which arise in such simulation are with computer accessibility, hardware specifications, group grading issues, unclear role of instructor, startup costs and resistance to change from both student, teachers or both.

Teaching through reality based methods was highly recommended by the National Science Education Standards due to the effective learning simulations provide. In a study conducted by Curland & Fawcett (2001) on undergraduate students from the field of finance, it was found that students were able to apply the learnt knowledge to build up support for the next module in finance. Simulation helped them in improving the overall understanding of the subject and prepared them for future modules by improving their overall analysis quality. Similar was the finidings of Kumar & Sherwood (2007, p.239) who analyzed the simulation conducted on undergraduate science students which showed gains compared to returns from non simulation study by increasing the conceptual understanding of the topics simulated.

Compared to traditional tools of education simulations have a higer retention level of concepts learnt. Randel et al.(1992, p.269) concluded in their study that the retention of materials covered through simulation is greater than the conventional class room setting. Students express more interest in simulation activities compared to normal class room lecture sessions.
A disadvantage to the use of simulation comes from the study of Storrs & Inderbitzin (2006, p.175) who maintained that student learning is dominated by the conventional class room method of attaining knowledge. In their opinion the conventional mode of class room study is such a powerful medium that at times it is difficult for the student to imagine alternate forms of learning such as simulation which is a challenge for liberal education.

Effectiveness of simulations with respect to the element of design and animation was studied by Plass, Homer, & Hayward, (2009) who summarized that, the higher the level of interactivity with respect to visualization of the simulation the higher is the learning. In studies made by (Chandler,2004; Hegarty,2004; Rieber,1990; Wouters et al. 2007) cited in Plass et al.(2009) it was shown that learning is aided by the help of increased cognitive engagement and hence increases the intrinsic motivation to learn. However, it is very easy to have an overload of information by the user to process and retain information regarding how to use the simulation. This overload is in accordance with the Cognitive Load Theory which outlines that when there is too much information to process or retain, a cognitive load is experienced by the user. This load restricts efficient understanding and processing of information.

Simulation provides effective learning experience in education for which it is valued by both teachers and students and hence is one reason for the widespread acceptance. Simulations help in replicating complex and realistic situations to be handled by the students without the actual event in real. Furthermore, the authors point out that simulations are beneficial in “replication and repetition, practicing and developing skills and competences, realizing insight and understanding, appealing to the need for communication and cooperation, offering an integration of learning experiences, learning to learn… (Moratis & Hoff, 2006, p.219)”.

Simulations focus on results and output orientation which is an important requirement for management studies.

As evident from the effectiveness of simulations in education, today it is important to increase the emphasis of their role in business schools as well. In this connection American business schools are trying to focus more to adapt international business concept and approaches which can be observable in local, international and global perspectives. In perspectives of teaching international policies and dynamics, the authors suggest the use of a simulation that is comprehensive enough to provide more learning compared to individual business policy modules (Klein & Fleck, 1990, p.148). In order to capture what the literature outlines and to provide a collective view of information provided by the earlier studies figure 3.2 was developed. The figure 3.2 explains that effective educational simulations should follow the variables outlined in it and especially be motivating, realistic, fun way of learning and easy to use for the user.

Figure 3.2 Requirements for an effective simulation
In a simulation conducted in Taiwan Tao, Cheng, & Sun (2009, p.937) concluded many important results of which two are most significant. Firstly it was concluded through the study of Taiwanese students that the average perceived attractiveness by the students was 4.49 of 7 on Likert scale. This number (4.49) represented a stage just between the average and satisfied response. Secondly very few students used the simulation, which was not expected by the researchers and it demonstrates that the interest of Taiwanese students in simulation was low. Although Tao, Cheng, & Sun (2009) did not provide the reason for the low usage of simulation in Taiwan but the overall literature suggests that some of the potential reasons could be from figure 3.3 that may had contributed to the cause of failure in Taiwanese experiment.

![Figure 3.3 Issues that can make a Simulation ineffective](image)

It is a fact that simulations are being used as a learning tool in class rooms and in research as well. Through our literature review we established that early authors who were writing in the field of simulation as a pedagogy tool failed to establish if simulation were effective teaching tools. However, with future researches the validity of simulation as a pedagogy tool was established. Unfavorable points for the use of simulations were that it is mostly a gaming activity. It is time consuming which causes lack of interest and concentration in the module materials (Klein & Fleck, 1990, p.153).

3.6 Effects on students:
The students in US business schools who undertook simulation maintained that it helped them “in developing the competences that were needed to systematically solve problems, making forecasts in environments that are characterized by uncertainty, and measuring objectives Teach’s research (1993, cited in Moratis & Hoff 2006, p.219)”.

Similarly Gremmen & Potters (1997, cited in Moratis & Hoff 2006, p.219) showed students undertaking simulation had better results compared to those who did not take the simulation. In addition Wolfe & Chanin (1993, cited in Moratis & Hoff 2006, p.219) concluded that students who took simulation had an improvement in their knowledge base regardless of the knowledge base they held prior to undertaking a simulation.

We think if the learning tool is used in a way that appeals to the students and is enjoyable, students will spend more time using that tool. Results from Douglas et al. (2008, p.15) concluded that even if the students did enjoyed learning through simulation they did not spent enough time as was benchmarked and expected by the simulation team. Another issue that came to light was that students who undertook a simulation in the past are prone to be more involved and spend more time on simulations compared to those students which have never undertaken simulation and are unfamiliar of it. Studies by Starkey & Blake (2001) and Galea (2001, cited in Douglas et al., 2008, p.15) also add strength to the claim that unfamiliarity, less user friendly interface, technical mismatches and being less practical to the business environment are the main causes of students spending less time on the simulation.
Various Theories of Learning:
The theories we will use to support our topic are either constructive or instructive. In instructivist approach, solutions are found to the problems within optimal level on the basis of same interest for everyone. In contrast to the instructivist approach the constructivist approach finds solution according to persons mind (Thavikulwat & Pillutla, 2008, p.209). For this study, Jerome Bruner’s constructivist theory, problem based learning approach, multiple intelligences, transfer of learning; cognitive load theories have been used. In the following pages firstly these theories are explained in brief and then a conclusion of how it relates to our study is provided.

3.7.1. Constructivism (Learning Theory):

Jerome Bruner's constructivist theory or discovery learning theory considers the link between the mode of instructions and the cognition process. Explaining the constructivism approach followed by Bruner, (Psychology.org, 2011) states that for a learner, the past and current knowledge is the basis of active learning process where he/she uses the information to make certain hypotheses and based on these hypotheses makes a decision. The cognitive structure provides the meaning to process the past or currently learnt information to generate knowledge. The implications for teachers here is to motivate students to find principles themselves. This can be achieved by indulging into active dialogue between the student and the teacher. The goal for the teacher should be to mould the information to a level that can be understood by the learners keeping in view the learners current state of understanding.

Present on (Psychology.org, 2011) is the view of Bruner (1966) who maintains that the theory of instruction should focus on “(1) predisposition towards learning, (2) the ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner, (3) the most effective sequences in which to present material, and (4) the nature and pacing of rewards and punishments. Good methods for structuring knowledge should result in simplifying, generating new propositions, and increasing the manipulation of information of (Bruner, 1966)”. Considering Bruner’s theory, teachers must address the issue that the message to be delivered must meet student expectations. The way of delivering the message should increase students willingness to learn. It should be kept as simple as possible to be understood easily by the students. Lastly it should motivate the students to find their knowledge gaps and fill those with the new information being passed on. Simulations are designed on the premise of discovery based learning. Furthermore, Action learning model proposed by Reg Revans is also of interest for this topic. According to (Oxford Brookes Univeristy, 2011) website Revans considered as the father of action learning approach was of the view that, for the purpose of learning there has to be an action base since learning is impossible without action or implementation of the learnt concepts. Simulations provide such action base where students apply their learnt concepts on predesigned scenarios to understand the effect of their actions.

Summary:

In this theory it was stressed that the mode of instructions is an important element of the overall cognition and learning process.

For any learner the past and current knowledge provide means of active learning. Teachers normally teach the theoretical part of a module through tools such as class lectures, guest lectures and self studies. The use of simulation provides an active / practical means to learn
and practice different concepts which alone cannot be learnt effectively through theoretical means such as lectures.

A simulation includes the major points of this theory such as providing the learning concepts in the manner they could be easily and effectively grasped. Through research of authors cited in the literature review we found simulation is the most effective tool in various fields of education and remains a highly effective tool of imparting knowledge.

Good simulations provide structured knowledge which is simple to understand and ensures higher learning. Therefore, simulations when used as a medium of instruction should focus that the message to be delivered must be in line with student expectation. The mode of message delivery increases student willingness to learn. Doing so will provide a predisposition towards active learning. However, it should also be ensured that the complexity of the simulation should not hinder learning. The ultimate goal of simulation according to this theory should be to provide motivation to the students to fill their knowledge gaps.

3.7.2. **Problem-Based Learning Approach:**

This approach was founded by the medical school at McMaster University in Canada during Late 1960s. There have been many variations introduced by many schools but the basic principles of the approach remain the same. The approach focuses on the principle that for the purpose of learning, the driving force is the challenge whose solution is open ended in nature which has no specific right answer. The problems are studied in restricted domains and are situation specific (Learning-Theories, 2011). According to (Maricopa Center for Learning & Instruction, 2011) students in shape of teams are encouraged to use their own knowledge to find a solution. This solution is the result of their group knowledge which is based on active scrutiny of what they have learnt/experienced in the past. The solution of the issue is reached through consensus and implemented to see the results of the action. Here the role of the teacher is to facilitate and only to guide. The students’ queries are encouraged so they take an active approach in discovering the use of the knowledge gained over time to provide a solution.

**Summary:**

The theory outlines that for the purpose of learning if there is an open ended solution (i.e. there is no right or specific way to achieve the solution) it serves as a driving force for learning.

Simulations provide an opportunity to explore the impact of diverse ideas in restricted domains that can be used as alternatives for problem solution. It encourages the students to use their own knowledge to take a decision and feel the impact of that decision.

3.7.3. **Multiple Intelligences (H. Gardner)**

According to (Psychology.org, 2011) Multiple Intelligences approach by Gardner points out that information is processed in different forms. These forms are “linguistic, musical, logical-mathematical, spatial, body-kinesthetic, intrapersonal (e.g., insight, meta-cognition) and interpersonal (e.g., social skills). Gardner points out that the different intelligences represent not only different content domains but also learning modalities. A further implication of the theory is that the assessment of abilities should measure all forms of intelligence, not just linguistic and logical-mathematical (Psychology.org, 2011)”. 
Summary:

This theory outlines that information can be processed through various modes such as linguistic, musical, logical - mathematical, interpersonal etc. Simulation is a combination of various modes as mentioned previously. Utilizing multiple processing modes improve the effectiveness of the learning compared to other learning tools.

3.7.4. Transfer of Learning and Principles of Learning:

Transfer of learning is an important concept explored by Mayer, Dale, Fraccastoro, & Moss, (2010, p.66) who discussed four points that were made by other authors. First the authors cited research of (Brown, Bransford, Ferrara, & Campione, 1983; Carey & Smith, 1993; Chi, 2000) which relates to the notion that “initial acquisition of knowledge is necessary for transfer” of learning from teachers to student. Furthermore, (Bransford & Stein, 1993; Brown, 1990; Klahr & Carver, 1988; Littlefield et al., 1988) cited in the same study considered that students who solely memorize have less tendency of relating to a problem solving task. Secondly (Ericsson, Krampe, & Tesch-Romer, 1993) cited by the authors suggest that learning becomes more effective when the learner implements the learnt by intentionally applying it to some stimulus. Thirdly the learning content should be of considerable importance since simple contents may not help the applicability of knowledge in multiple scenarios (Perkins & Salomon, 1992). The forth and the final point is that the transfer of learning is effected by the perceptions held by the students about the applicability and realistic nature of the simulation (Anderson, Reder, & Simon, 1996).

Summary:

The theory outlines that for the transfer of learning four points are important. Firstly there should be some “initial acquisition of knowledge”. Secondly, “implementation of what has been learnt”. Thirdly “the learning content is of considerable importance.” Forth and finally students should perceive there is applicability and reality of the content being delivered.

Simulations take into account all the above four points in order to provide an effective learning tool.

3.7.5. Cognitive load theory:

According to Sweller (1988) who is renowned for his work on the cognitive load theory provides evidence that expert and novice users process information in their respective domains when dealing a problem. The schemas form the basis of difference between a novice and expert user. Sweller’s work show that conventional problem-solving procedures are not effective. He proposes that the cause of this is the learning device or the medium through which the message is passed. According to him there should be a cognitive overlap between the activities. Furthermore, large amount of cognitive processing capacity is required if undertaking a means-ends analysis. This large amount of processing capacity is generally not available for schema (schema is learning new knowledge on the basis of what has been learnt in the past) acquisition. This means that if large amount of information needs to be processed in smaller amounts of time then the efficiency to process the information will drop. Hence the goal here is to reduce the load on the long-term working memory while encouraging the schema capacity to do most of the knowledge reception and knowledge development.
The theory also states that the human brain processes information in terms of short term and long-term processing. Generally the short term memory is limited and it is challenging to retain information that exceeds the short term capacity. According to John, Merrienboer, & Paas (1998) the purpose of the cognitive load theory is to provide guidelines to help information deliverers in delivering their message in a way that helps the learner to grasp it in the optimal performance manner. There are three types of cognitive loads intrinsic, extraneous and germane. Intrinsic loads are innate in nature and always exist and the level of difficulty cannot be changed by the teacher yet the teacher can make profound influence by breaking the big schema into smaller parts to provide smooth short term memory loads. The extraneous is the load generated by the approach the message is passed on to the listener and can be greatly controlled by the sender. Lastly germane cognitive load is the load of “processing, construction and automation of schemas.”

Summary:

The theory defines that expert and novice user’s process information in their respective domains when dealing in a problem solution.

Simulations are related to this theory in the sense that while simulations can be comprehensive but the time required covering all the learning outcomes could be small. Even the briefing sessions regarding the dynamics of the simulation and how to use it can take too much time and share too much information. Any information load under this scenario could become an overload very easily considering the comprehensiveness of the simulation itself. Therefore the implication of this theory with respect to simulation is that the ‘schemas’ or the amount of information to supply the user should be measured according to the cognitive capacity of students. At times it is difficult to assess the cognitive capacity and this comes as a challenge to quantify the amount of information for the schemas.
4. Empirical findings:

4.1. Respondents profile:
The appropriate respondents for this study were those students who had undertaken a simulation in business studies. These included the students of entrepreneurship and marketing section at USBE. A total of 120 students qualified for those being appropriate respondents for the study. However, only 95 responded to the request of participating in the survey. 6 responses were incomplete and hence removed from the sample, leaving the final number to be 89 responses. Out of 89 responses, 82 i.e.(92%) of the sample had taken simulation at least once during their educational tenure. 7 respondents amounting to 8% of the responses did not undertook simulation and were excluded from this study. This lack of 8% would not make a big difference in the overall findings of the study.

Figure 4.2 a) shows the distribution of the number of times the respondents had taken the simulations during their studies. Majority i.e. 79% of the students took simulation at least once whereas 21% had taken simulation more than once. Figure 4.2b) displays the level at which the respondents undertook the simulation and is dominated by the masters students with 82% of the pie.

The study was focused on the students from entrepreneurship and marketing programs of USBE. In one of the marketing module ‘Advance Market Analyses’ Markstrart was the simulation given to students. In entrepreneurship the module was ‘Entrepreneurship & Growth’. The distribution in the table 4.1 shows almost the same proportion of students who undertook the simulation in the two modules at USBE. The option ‘others’ represent those simulations which were taken by students in programs other than those provided by USBE.
Table 4.1 In which module(s) have you taken simulation?

<table>
<thead>
<tr>
<th>Module</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance Market Analysis</td>
<td>34</td>
<td>41.5</td>
<td>41.5</td>
<td>41.5</td>
</tr>
<tr>
<td>Entrepreneurship &amp; Growth</td>
<td>32</td>
<td>39.0</td>
<td>39.0</td>
<td>80.5</td>
</tr>
<tr>
<td>Others</td>
<td>16</td>
<td>19.1</td>
<td>19.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.2. Excitement level:

The respondents were asked in general about their experience of overall excitement about having a simulation in a module. It is apparent that class lectures are the most widely used medium in imparting education. Their extensive use creates a feeling of boring in learning overtime. It was expected that the students will be more excited if provided a chance to use simulation. The results show an overwhelming 94% of the respondents (which were excited or excited to some extent) favouring to have simulation a part of the module.

![Excitement about simulation in a module](image)

4.3. The things which students like in Simulation:

The respondents were questioned that according to them what is/are the things they like in a simulation. 31 responses out of 82 were that it is practical work or application of learnt concepts in a practical setting. 8 respondents like simulations because they encourage a team effort to the scenario(s) solution. Similarly 10 responses outlined that the best thing about a simulation is that it offers learning connected to the reality. 9 respondents felt the best thing about the simulation is its tendency to provide model or figures which help in decision making. The implications from these results are that teachers when opting for simulations must consider covering those topics or concepts which have a practical orientation and that
they could be replicated in real life conditions to increase the effectiveness of learning from simulation.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No reply</td>
<td>4</td>
<td>4.88</td>
</tr>
<tr>
<td>Practical work</td>
<td>31</td>
<td>37.80</td>
</tr>
<tr>
<td>Competition</td>
<td>3</td>
<td>3.66</td>
</tr>
<tr>
<td>Quick results</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Team/group work</td>
<td>8</td>
<td>9.76</td>
</tr>
<tr>
<td>Working on all objectives</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Gaming</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Active learning</td>
<td>2</td>
<td>2.44</td>
</tr>
<tr>
<td>Global overview</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Challenging</td>
<td>6</td>
<td>7.32</td>
</tr>
<tr>
<td>Result supports in decision making</td>
<td>9</td>
<td>10.98</td>
</tr>
<tr>
<td>Learning by fun and game</td>
<td>4</td>
<td>4.88</td>
</tr>
<tr>
<td>Knowledge base</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Learning by reality</td>
<td>10</td>
<td>12.20</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.00</td>
</tr>
</tbody>
</table>

4.4. Worst things in Simulations:

Students were asked about their views regarding what are the worst thing(s) they consider in a simulation. In this regard 22 students i.e. 27% said nothing or did not reply in against the simulation. It means that in their perception there is no negative association of issues with simulation. 14 students accounting to 17% consider that simulation takes too much time which is a problem in using simulations extensively. The rest of the sample responded by considering that simulations require too much information to remember when solving a scenario, sometimes difficult to use, license fee for subscription is high and complex design of the simulation leads it to be less user friendly.

The implications from these results are that while majority of students did not indicate any issues with simulation, they perceive the activity to be time consuming. Further if we consider the cognitive load theory too much information load in less time causes cognitive overload which leads to decline in learning and reduces the effectiveness of the learning tool. Teachers when opting for the use of simulations must consider time constraints and the amount of information to be disseminated at the time of initiating a simulation. A better approach would be to advise the dynamics of the simulation to the students throughout the module. It means that information about the dynamics of the simulation should be provided from the beginning to the end of the module in small quantities. This approach will discourage a cognitive load and problems with information retention at the time when simulation is provided to the students. In this way the effectiveness of simulation is not hampered due to cognitive overload or lack of information on how to use a simulation.
Table 4.3 Things students dislike in Simulation

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Reply</td>
<td>11</td>
<td>13.41</td>
</tr>
<tr>
<td>Less time in decision making</td>
<td>6</td>
<td>7.32</td>
</tr>
<tr>
<td>It is still simulation/not real</td>
<td>12</td>
<td>14.63</td>
</tr>
<tr>
<td>Time consuming</td>
<td>2</td>
<td>2.44</td>
</tr>
<tr>
<td>Complexity</td>
<td>2</td>
<td>2.44</td>
</tr>
<tr>
<td>Nothing</td>
<td>11</td>
<td>13.41</td>
</tr>
<tr>
<td>Too much imagination</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Shorter time in practical than demonstration</td>
<td>3</td>
<td>3.66</td>
</tr>
<tr>
<td>No interaction with teacher</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Difficult/hard</td>
<td>6</td>
<td>7.32</td>
</tr>
<tr>
<td>Result error</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>It takes too much time</td>
<td>14</td>
<td>17.07</td>
</tr>
<tr>
<td>Dramatic change in result</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Less guide line</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Coordination with group</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Specific right in simulation</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Payment for license</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Lack of clear feedback</td>
<td>1</td>
<td>1.22</td>
</tr>
<tr>
<td>Bad-designed process</td>
<td>6</td>
<td>7.32</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>82</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

4.5. Simulation as a motivator for module registration:

In previous studies mentioned in chapter 3, simulations were said to be a tool that excites students to enrol in modules which offers one. The researchers wanted to confirm the point by including it in this research. Therefore, students were asked that would they be willing to register in a module which offers a simulation. As expected, the response was positive and 81% of the result lies in strong agreement and agreement category. This confirms the points that students find simulation as a motivating factor to register in a module which offers it. The student responses in disagreement were almost negligible.

Table 4.4 Simulation provides motivation for module registration

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No reply</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>21</td>
<td>25.6</td>
<td>25.6</td>
<td>26.8</td>
</tr>
<tr>
<td>Agree</td>
<td>45</td>
<td>54.9</td>
<td>54.9</td>
<td>81.7</td>
</tr>
<tr>
<td>Undecided</td>
<td>12</td>
<td>14.6</td>
<td>14.6</td>
<td>96.3</td>
</tr>
<tr>
<td>Disagree</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
<td>97.6</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>2</td>
<td>2.4</td>
<td>2.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
4.6. Simulation as a fun way of learning in the module:

Simulation/gaming is also renowned as fun way of learning by which students can enjoy and take interest in gaming along with study. In this perspective, a question was asked and we found an overwhelming 77 respondents in agreement to the notion. 94% agree that simulation as a learning tool is a fun way of learning.

<table>
<thead>
<tr>
<th>Table 4.5 Simulations are fun way of learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Undecided</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

4.7. From learning perspective Simulation is a challenging task compared to other tools:

A question was raised if students find simulation as a challenging activity. When an actual simulation is provided it has certain objectives which the user must accomplish. This provides a challenge for the user to balance the time, resources, group dynamics and the overall strategy which makes it a challenge task. Findings show that a small minority (again negligible) displays disagreements on the question. On the other hand 72 respondents who are almost 88% accept that simulations are challenging activities from the learning perspective.

<table>
<thead>
<tr>
<th>Table 4.6 Simulations are challenging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Undecided</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Strongly Disagree</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>
4.8. Simulations leads to more learning compared to guest speakers:

This question was raised to investigate the opinion students maintained regarding which toll is more learning, simulation or guest speakers. Empirical finding show that 56% are in agreement that simulation leads to more learning than guest speaker sessions. In contrast disagreement percentage is just 13% but on the other hand approximate 30% respondents could not decide anything yet. We therefore concluded that simulation leads to more learning than guest speakers/license.

<table>
<thead>
<tr>
<th>Table 4.7 Simulation leads to more learning compared to Guest speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>No reply</td>
</tr>
<tr>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Undecided</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

4.9. Simulations leads to more learning compared to group discussion:

Students were asked if they viewed simulation leads to more learning compared to group discussions. Result shows that 46 respondents agree, 11 disagree and 23 respondents were undecided. Overall it seems from the figures that simulation is a better learning tool compared to group discussion as perceived by the respondents.

<table>
<thead>
<tr>
<th>Table 4.8 Simulation leads to more learning compared Group discussions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>No reply</td>
</tr>
<tr>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Undecided</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

4.10. When students should use simulation:

The respondents were asked the question that what is the most appropriate time during the module in which the simulation should be used. Results reveal that 37 respondents agree that simulation should be used during the module. Simultaneously 19 and 18 responses were received that simulation should be used at the starting and end of the module respectively. By view of above findings it is better to use simulation during the module.
Table 4.9 When do you think Simulations should be used

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No reply</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Starting of the module</td>
<td>19</td>
<td>23.2</td>
<td>23.2</td>
<td>24.4</td>
</tr>
<tr>
<td>During the module</td>
<td>37</td>
<td>45.1</td>
<td>45.1</td>
<td>69.5</td>
</tr>
<tr>
<td>End of module</td>
<td>18</td>
<td>22.0</td>
<td>22.0</td>
<td>91.5</td>
</tr>
<tr>
<td>Not sure</td>
<td>7</td>
<td>8.5</td>
<td>8.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

4.11. Simulation should be made part of every module:

Reflecting upon our experiences of taking an opportunity to be part of a simulation that lasted for only seven hours throughout the entire module, overall assessment by the students in the class regarding the simulation was very welcoming. One possible reason for student appreciation was due to simulation brought a change to the conventional mode of study. Students were asked if they would want to take simulations in every module they undertook. The response revealed that 26.8% respondents could not decide if simulation should be part of every module. One possible reason could be that most of the students undertook one simulation and their opinion might shift when they gather more experience from taking more simulations. 52.5% lies in the acceptance range where they think simulation should be part of every module while 20.8% constitute disagreement.

Table 4.10 Should Simulation be made part of every module

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>14</td>
<td>17.1</td>
<td>17.1</td>
<td>17.1</td>
</tr>
<tr>
<td>Agree</td>
<td>29</td>
<td>35.4</td>
<td>35.4</td>
<td>52.4</td>
</tr>
<tr>
<td>Undecided</td>
<td>22</td>
<td>26.8</td>
<td>26.8</td>
<td>79.3</td>
</tr>
<tr>
<td>Disagree</td>
<td>14</td>
<td>17.1</td>
<td>17.1</td>
<td>96.3</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>3</td>
<td>3.7</td>
<td>3.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

4.12. Satisfaction with your performance as a part of group work.

Generally simulation takes a group based setting where students work as a team with different or similar responsibilities for achieving the outcome of the simulation. Sometimes in a group dynamics one of the members may be lacking the required participation level. Therefore, a question was raised to know if the students were satisfied with their own participation in the simulation they undertook. From results 65 respondents perceive their participation as satisfactory which accounts to 80% of the sample. The other 13% were undecided where as only 5 respondents perceive their participation not satisfactory. In the end the figures indicate that majority of the students were satisfied with their participation in the simulation as being a member of a group or team that used the simulation.
4.13. Use of Simulation again:
Simulations are used in educational institutions for pragmatic learning. Because of its gaming nature it is often taken as a fun way of learning. Since simulations often being perceived as a fun way of learning and a pragmatic approach, students generally want to use it again in other modules. Respondents were asked about whether they would like to use simulation again? Majority students replied “Yes” which represents 77% of the pie and this fact is as higher than others. Only 4% of the sample reflects those students who would not like to use simulation again. These above facts show that students are in favor of using simulation again in their educational career.

![Figure 4.4 Repeat use of Simulation](image)

4.14. Simulation as alone tool for learning:
In academic education different types of learning methods are being used such as class lecture, group discussion, guest speakers and simulation. Students have different opinion about learning potential regarding these learning tools. In this regard 48 out of 82 respondents considered that simulation alone cannot provide all the learning in a module. Only 15 respondents agreed that simulation alone can provide all the learning in the module.

![Figure 4.5 Learning from Simulation](image)
4.15. Retention level of the concepts covered in the simulation:

Retention of learnt concepts is an important tool for measuring the effectiveness of a simulation. Through empirical findings it was established that 44% respondents believe that retention level of concepts learnt from simulation is high. 48% feel the retention level of learnt concepts and experiences is medium.

This chapter can be summarized by reporting the main findings in the following lines which will help the flow of thoughts for the analyses and hypotheses connection. Therefore, a summary of findings is as follows.

- 94% respondents were excited of simulation being part of the module. The excitement reflects a motivational aspect to take a particular module offering a simulation.
- The word simulation brings the thoughts of practical learning, learning through a gaming approach, an exercise that replicates realistic environment in classroom setting etc.
- Simulations are liked by students due to the fact that they provide practical learning through the application of learnt concepts in real life settings, they encourage teamwork and helps to improve management of group dynamics amongst team members. Moreover simulation can be used to predict the affects of decision making.
- Issues that simulations have are time pressure to complete the scenario. Some simulation run too long; require much information on how to perform the activities. Furthermore, they have the tendency to be too complex and less user friendly.
- 81% respondents perceive that they find simulation as a motivating factor to register in a module which offers it.
- 94% perceive simulation as a learning tool which is a fun way of learning.
- 88% accept that simulations are challenging in learning perspective due to the scenario and dynamics of the simulation.
- 45% respondents perceive simulation should be given during the module, 23% at the start of module and 22% at the end of the module. Rest of the percentage was not undecided.
- 52% respondents feel simulation should be part of every module while 21% constitute disagreement and rest of the percentage remains undecided.
- 80% respondents were satisfied with their own participation in the simulation they undertook as part of a team.
- 77% respondents answered that they would like to use simulation again, 18% answered they might want to use it and only 4% rejected the idea of using a simulation again.
- 15% respondents perceive that simulation alone can provide all the learning in a module.
- 44% respondents believe that retention level of concepts learnt from simulation is high and 48% feel the retention level of learnt concepts and experiences through simulation is medium.
5. Analysis:

This chapter has two contributions. Firstly it will provide the analyses of the finding from the previous chapter and secondly a model will be developed. The discussion on the model will be elaborated after the analysis is complete. The composition of this chapter with regards to analysis of findings is such that firstly some important findings are analyzed. Then the hypotheses which were developed in literature review are presented here with the connection to literature. The statistics and tests are provided for acceptance and rejection of the hypotheses. Lastly, there will be discussion and formulation of the model which was discussed in chapter 1 but will be elaborated in detail in this chapter.

5.1. Analysis of findings:

5.1.1. Simulation as a motivator for learning in the module:

In a study made by Faria (2001, cited in Snow et al., 2002, p.527) she studied the progress of simulations for the past 25 years at the Association for business simulation and experiential learning (ABSEL). She concluded that learning from simulation/games has been more famous and motivational for the students than other learning techniques. She found that simulations enhance students’ performance. Empirical findings from our research also confirm the same notion. 77 respondents out of 82 agree on above statement that indicates rather positive response which reflects a 94% approval for agreement that simulation provides motivation in learning in a module. Whereas disagreement to the point that simulation does not motivate learning is insignificant and negligible.

<table>
<thead>
<tr>
<th>Motivation from Simulations for learning in the module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Undecided</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

5.1.2. Simulations are learning experience:

Simulation provide effective learning experience in education for which it is valued by both teachers and students and hence is one reason for the widespread acceptance Moratis & Hoff, (2006, p.219). On the basis of this argument the students were asked the question if simulation are learning experience? In conclusion of the findings 96% respondents agree on Moratis & Hoff’s statement. In contrast respondents for disagreement are were zero and
undecided represent a negligible percentage. It is to observe that for this question there was not a single response for strongly disagree or disagree.

### Table 5.2 Simulations are learning experience

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valid</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>37</td>
<td>45.1</td>
<td>45.1</td>
<td>45.1</td>
</tr>
<tr>
<td>Agree</td>
<td>42</td>
<td>51.2</td>
<td>51.2</td>
<td>96.3</td>
</tr>
<tr>
<td>Undecided</td>
<td>3</td>
<td>3.7</td>
<td>3.7</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>82</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

5.1.3. **Simulations leads to more learning compared to class lecture:**

Teaching tools such as class lecture, self study, guest lectures and group discussion are most widely used by teachers in an educational institution. These learning tools provide much knowledge and information to the students. On the contrary, literature review shows simulation leads to more learning compared to class lecture and other tools. Consequently a questioned was designed to investigate the perception of students on this point. The survey provided the findings according to which 11 respondents or 13.4% were in disagreement portion. 63 respondents or 78% exist in agreement portion that are almost 6 times more than those who disagreed. Therefore, we can conclude student perception is that simulation based learning is more fruit full than others learning tools.

### Table 5.3 Simulation leads to more learning compared to Class lectures

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valid</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No reply</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>20</td>
<td>24.4</td>
<td>24.4</td>
<td>25.6</td>
</tr>
<tr>
<td>Agree</td>
<td>43</td>
<td>52.4</td>
<td>52.4</td>
<td>78.0</td>
</tr>
<tr>
<td>Undecided</td>
<td>7</td>
<td>8.5</td>
<td>8.5</td>
<td>86.6</td>
</tr>
<tr>
<td>Disagree</td>
<td>10</td>
<td>12.2</td>
<td>12.2</td>
<td>98.8</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>82</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

5.1.4. **Simulations leads to more learning compared to self study:**

We further designed a question asking if simulation is more learning compared to self study. Findings show only 43 respondents that is 52.5% are in agreement that simulation leads to more learning compared to self study, whereas 22% respondents show their opinion against the statement. We conclude that simulation leads to more learning compared to self study.
### Table 5.4 Simulation leads to more learning compared to Self study

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>82</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>No reply</td>
<td>1</td>
<td>1.2%</td>
<td>1.2%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>21</td>
<td>25.6%</td>
<td>25.6%</td>
<td>26.8%</td>
</tr>
<tr>
<td>Agree</td>
<td>22</td>
<td>26.8%</td>
<td>26.8%</td>
<td>53.7%</td>
</tr>
<tr>
<td>Undecided</td>
<td>20</td>
<td>24.4%</td>
<td>24.4%</td>
<td>78.0%</td>
</tr>
<tr>
<td>Disagree</td>
<td>15</td>
<td>18.3%</td>
<td>18.3%</td>
<td>96.3%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>3</td>
<td>3.7%</td>
<td>3.7%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

#### 5.1.5. Simulations require much information to retain on how to use it:

Referring to a simulation pointed in Snow et al. (2002, p.528) the particular simulation provided an economic based scenario in which the students play a pivotal role. This role included strategic planning and decision making in the organizational perspective of competing global marketplace. However, when simulations tend to get complex the information retention on how to solve the simulation gets affected. To understand this point we asked the respondents that when the simulation should be played. 27 and 1 respondents out of 82 responded not sure and or did not reply respectively. 19 respondents i.e. 23.3% maintained that it should be played on starting of the module whereas 24.4% maintained it should be played during the modules. According to these facts and our observation, simulation should be played during the module that could definitely provide more information to the students.

### Table 5.5 Do you think there was too much information to retain on how to play the simulation

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>82</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>No reply</td>
<td>1</td>
<td>1.2%</td>
<td>1.2%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Starting of the module</td>
<td>19</td>
<td>23.3%</td>
<td>23.3%</td>
<td>24.2%</td>
</tr>
<tr>
<td>During the module</td>
<td>20</td>
<td>24.4%</td>
<td>24.4%</td>
<td>48.8%</td>
</tr>
<tr>
<td>End of module</td>
<td>15</td>
<td>18.3%</td>
<td>18.3%</td>
<td>67.1%</td>
</tr>
<tr>
<td>Not sure</td>
<td>27</td>
<td>32.9%</td>
<td>32.9%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
5.1.6. **Teachers can correctly assess individuals’ performance for grading at Simulation:**

According to Klein & Fleck (1990) simulation games are used in different ways in education and it increases students’ performance. Moreover, games are also used as research and teaching tools; it increases effective learning in students as well as games create interest and motivation. But on the other side it was important to know about teachers’ assessment for individuals in this regard. Empirical findings indicate 40 respondents amounting to 49% feel that teachers cannot assess the individual performance of the students in a group simulation. In contrast only 23 respondents amounting to 28% of the respondents are in disagreement. Overall we can say that students perceive that teachers cannot assess the individual students’ performance for grading in a group setting.

| Table 5.6 Can teachers correctly assess the individual student’s performance for grading |
|---------------------------------|---------------------|---------------------|--------------------|---------------------|
| Frequency | Percent | Valid Percent | Cumulative Percent |
| No reply | 1 | 1.2 | 1.2 | 1.2 |
| Strongly Agree | 4 | 4.9 | 4.9 | 6.1 |
| Agree | 19 | 23.2 | 23.2 | 29.3 |
| Undecided | 18 | 23.6 | 22.0 | 51.2 |
| Disagree | 32 | 37.1 | 39.0 | 90.2 |
| Strongly Disagree | 8 | 9.8 | 9.8 | 100.0 |
| Total | 82 | 100.0 | 100.0 | 100.0 |

5.1.7. **Important factors for a simulation development:**

The work of Virvou & Katsionis (2008, pp175-177 ) points out that likeability and usability of a simulation are the major benchmarks of effective simulation from students perspective. In this study a question was developed where students ranked their perception of the most important factors they consider in a simulation. Points were allocated to these ranks according to the rank. Overall results indicate that according to students’ perceptions, learning and teamwork are the two main benchmarks of an effective simulation. The use ability- likeability benchmarks do not come as major benchmarks in this study.

![Figure 5.1 Important factors to consider in a Simulation](image)
5.2. Hypothesis Testing:

5.2.1. Hypothesis 1:

Landsberger (2004) in order to understand the difference between game and simulation, conducted an interview with Dr. Kurt Squire (who is an assistant professor in educational communications and technology at the University of Wisconsin at Madison and a visiting research fellow at MIT). Dr Squire explained the difference by answering that a game is an extension of the simulation. In his opinion games are interesting simulations. The literature does indicate that there is positive correlation between the variables perception of excitement and perception of it being fun but literature does not provide the nature of strength between these variables. We think that the nature of correlation should lie in moderate range of Pearson coefficient i.e. (moderate 0.3 to 0.69). Therefore, the following hypothesis was developed to inspect the positive strength of correlation between the variable.

\begin{align*}
\text{Students who find a simulation to be exciting part of the module perceive it as a fun way of learning.} \\
H_0: \text{There is not a moderate positive correlation among variables of perceiving simulation as exciting and perceiving it as a fun way of learning.} \\
H_1: \text{There is moderate positive correlation among variables of perceiving simulation as exciting and perceiving it as a fun way of learning.}
\end{align*}

The table 5.7 shows that the correlation coefficient from our findings is 0.449. This shows a moderate correlation between the variables as it is in the range (0.3 to 0.7). This can be interpreted as students when knowing that simulation is a part of the module they felt excited studying that module. Therefore we reject the null hypothesis and accept alternate to conclude that the variables have a moderate positive correlation amongst each other relation.

\begin{table}[h]
\centering
\caption{Correlations between Excitement and Learning}
\begin{tabular}{|l|c|c|}
\hline
 & Excited to know about a simulation in the module? & Simulations are fun way of learning \\
\hline
Excited to know about a simulation in the module? & Pearson Correlation & 1 \\
 & Sig. (2-tailed) & .449** \\
 & N & .000 \\
Simulations are fun way of learning & Pearson Correlation & 82 \\
 & Sig. (2-tailed) & 82 \\
 & N & 82 \\
\hline
\end{tabular}
\end{table}

**. Correlation is significant at the 0.01 level (2-tailed).
5.2.2. **Hypothesis 2:**

Teaching through simulation is a way of pragmatic learning and is one of the widely used tools in education at least in American business schools. Learning by using simulation is considered to provide more practice of the concepts learnt. It also increases confidence, motivation and efforts put into the learning process Snow et al. (2002, p.526). While simulation provides the motivation to learn and practice the theory, available literature does not provide empirical results regarding students who like simulation are more prone to take courses which provide simulation. If a relation could be found between these variables, teachers can better ascertain the population of students who would like to use simulation again and their behavior towards increased participation in specific courses which provide the simulation. We think there is a positive correlation between these variables.

**This hypothesis was developed to confirm if there is positive correlation in student perceptions who would like to use simulation again and their registering to a module which provides simulation.**

**H₀:** There is not a positive correlation for students who would like to use simulation again would register a module which provides simulation.

**H₁:** There is a positive correlation for students who would like to use simulation again would register a module which provides simulation.

The Null hypothesis states that those students who would like to take simulation again would not consider registering to a module which has a simulation included in it. The alternate hypothesis H₁ considers that students who would like to take a simulation again will prefer to register to a module which provides simulation.

**Table 5.8 Correlations between simulation motivation and repeat use of simulation**

<table>
<thead>
<tr>
<th>Simulations provide motivation for module registration</th>
<th>Simulations provide motivation for module registration</th>
<th>Would you like to use simulation again</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.348**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.001</td>
<td>.001</td>
</tr>
<tr>
<td>N</td>
<td>82</td>
<td>82</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Would you like to use simulation again</th>
<th>Pearson Correlation</th>
<th>.348**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig. (2-tailed)</td>
<td>.001</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>82</td>
<td>82</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).**

Through the analysis of data through SPSS as reflected in table 5.8 we found a positive but a weak correlation (0.348) between the two variables, since for a correlation to be positively strong it should lie in the range (0.7 and above). While there is a positive correlation between the variables, the strength is weak. Nonetheless this satisfies the alternate hypothesis by showing a positive correlation. Therefore, we reject null hypothesis H₀ and accept alternate hypothesis H₁ as relationship is significant and conclude that there is a positive correlation for students who would like to use simulation again would register a module which provides simulation.
5.2.3. **Hypothesis 3:**

According to Klein & Fleck (1990) simulation games are used in different ways in academic education to provide different benefits. Some of these benefits are increased students’ performance, increased effectiveness in learning, use as a research tool, creates interest and motivation towards learning and being an overall effective teaching tool.

Considering these benefits of simulation, it will be interesting to know the perceptions of students who undertook the simulation if they also perceive simulation to be the most effective tool for learning considering the benefits outlined by Klein & Fleck.

This hypothesis was developed to confirm the point of Klein & Fleck; do students at USBE who undertook simulation perceive simulation as the most learning tool or not?

- **H₀**: Students will not consider simulation as the most learning tool compared to others.
- **H₁**: Students will consider simulation as the most learning tool compared to others.

The researchers produced a ranking question where students ranked the option considering the most learning tool according to their perceptions. In contrast to co relational analysis, here a different type of analysis method is used. In this case instead of measuring the strengths of relation between variables, the researchers were interested in measuring if simulation will be considered the most learning tool according to student perceptions. For this purpose points were allocated to the ranks to allow numeric calculations. These points represent that for a tool, what is the quantifiable strength if learning potential needs to be translated for numerical interpretation. Empirically the differences were not significant enough from each other. It is worth mentioning that we expected the result would be almost similar numbers since all tools are learning tools and hence provide a comparative figure. As displayed in figure 5.2 simulation got the highest points i.e. 288 followed by group discussions 269. Class lectures were the third most learning tool. Although there is not much difference between the points of class lectures and simulation but still simulation got the highest points in terms of students perceiving it as a more learning tool compared to other tools. Therefore we reject the null hypothesis H₀ and accept alternate hypothesis H₁ concluding that students consider simulations the most learning tool of all.

![Figure 5.2 Most learning tool](image-url)
A simulation was analyzed by Snow et al. (2002, p.258) who concluded that the simulation they studied provided an economic scenario to the students. In this simulation the students played a pivotal role of forming teams, managing strategic planning and decision making for an organization which is competing in the global marketplace. The simulation stressed the teams to apply their knowledge for decision making and required critical response to the events in the scenario. Students practiced their learning on the basis of experiential and simulated events in which they were required to take the right decisions (Snow et al., 2002, p.528).

Snow et al., were of the view that simulations provide opportunity to the students to apply their knowledge for the purpose of learning. It would be interesting to know if students at USBE who took simulation perceived it as an exciting part of the module and secondly does this excitement influence their learning experience. We think there is a positive correlation in learning and excitement since when a student is excited to perform a simulation his overall assessment of simulation being a learning activity would be positively related. Therefore, the following hypothesis was developed.

**H0:** There is not a positive correlation among variables of being excited to know of simulation in a course with views of simulation being a learning experience.

**H1:** There is positive correlation among variables of being excited to know of simulation in a course with views of simulation being a learning experience.

<table>
<thead>
<tr>
<th>Table 5.9 Correlations between Excitement and Learning experience</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In general were you excited to know about a simulation in the module?</strong></td>
</tr>
<tr>
<td>Pearson Correlation</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td><strong>I think simulations are learning experience</strong></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>N</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**

Results in table 5.9 show a positive correlation (0.378) between excitement and learning experience. The strength of the correlation is moderate since it falls in the range (0.3 to 0.7). We can infer that, more the excitement better will be the learning experience since excitement can generate interest in solving the simulation. Therefore, we rejected null hypothesis H0, since p<.001 and accept alternate hypothesis H1 as relationship is significant and conclude that there is positive correlation between excitement and learning.
5.2.5. **Hypothesis 5:**

In case of sustainability education, simulation has become an important pedagogical tool in institutions. Simulation based training (SBT) offers an easy way for teaching sustainability in business education curricula. In this regard Salas et al (2009, cited in Mark 2010, p. 556) wrote that in management curriculum SBT is being used more frequently than others in terms of innovativeness and ethical decision making. Simulation can be used in undergraduate modules, executive education, online modules, as well as in MBA modules, but all those depend on its requirement to add value in to the module. In developing fields like sustainability, for the purpose of learning outcomes, simulation is playing a vital role in this regard. In business simulation gaming, students usually learn about business environment sustainability. For instance in the simulation competitive advantage such as profitability, sales, stock price and other related factors are constructed for 3 to 5 years that teaches sustainability of environment to the students (Mark, 2010). The concepts covered in the simulation can also be taught without the simulation but the effectiveness of learning may suffer. The researchers are interested in knowing the perceptions of students who undertook simulation at USBE if they consider simulation a better learning tool compared to other tools.

<table>
<thead>
<tr>
<th>Simulation as an instructional tool motivates the student for more learning in the module compared to other tool.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_0$: Students do not perceive simulation as the most liked tool for learning compared to others tools.</td>
</tr>
<tr>
<td>$H_1$: Students perceive simulation as the most liked tool for learning compared to others tools.</td>
</tr>
</tbody>
</table>

Similar to the analysis technique for hypothesis 3, points based method was used instead of Pearson correlation. Here we are interested in finding if students perceive simulation as the most learning tool in comparison to other tools (like class lectures, group discussion, guest speaking session and self study). A null hypothesis was generated considering that simulation is not the most liked tool and alternate hypothesis stating that simulation is the most liked tool. While the difference of points between simulation and other tools is small but empirical evidence in figure 5.3 shows that simulation is the most learning tool closely followed by group discussions. Hence the alternate hypothesis stating that student perceive simulations as the most liked tool for learning compared to others has been proved and accepted.

<table>
<thead>
<tr>
<th>Student Likeness of Various tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
</tr>
<tr>
<td>350</td>
</tr>
<tr>
<td>300</td>
</tr>
<tr>
<td>250</td>
</tr>
<tr>
<td>200</td>
</tr>
<tr>
<td>150</td>
</tr>
<tr>
<td>100</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Class lectures</td>
</tr>
<tr>
<td>244</td>
</tr>
</tbody>
</table>

Figure 5.3 Students most liked learning tools
5.2.6. **Hypothesis 6:**

To increase the role of simulations in business schools and keeping simulations effective, certain criteria’s needs to be considered. Two criteria’s were outlined by Virvou & Katsionis (2008, pp175-177) which according to the authors are the likeability and usability. These are the major benchmarks from student perspective, where likeability can be defined in terms of the experience gained by the user through the use of graphical-visual mode. While educational games provide a sophisticated and complex virtual environment, the conventional class room setting fails to adapt the environment which can be experienced through a simulation. Extending the view of Virvou & Katsionis on likeability and useability, it will be interesting to know if likeability and learning are somehow related considering the perceptions of students at USBE. Therefore, the following hypothesis was generated.

*The researchers wanted to see if there is any positive relation between likenesses and learning from simulation. Simulation is one of the tool of learning and students ranked it by comparing it with other tools, it is expected that there will be positive correlation between the likeability and usability of simulation compared to other tools. It is further expected that the likeability usability correlation will be the strongest for simulation compared to other tools.*

\[ H_0: \text{There is not a positive strong correlation in perception of students regarding, likeness of simulation and learning from simulation.} \]

\[ H_1: \text{There is positive strong correlation in perception of students regarding, likeness of simulation and learning from simulation.} \]

The following tables from 5.10 to 5.14 show the correlation between student learning and likeness of the specific pedagogy tool. Class lectures, guest lectures, group discussions, simulation and self study are all learning tools and are liked by students to some degree. It is difficult to conceive that there could be negative correlation between learning and likeness of any of the tool. The reason to this is that student form learning likeness perceptions for a tool in comparison to other tools. Therefore it was expected and now proved through empirical findings that all the correlations are positive. However, the highest positively correlated tool needs to be identified as per the requirement of our hypothesis. The significance of finding these correlations is that they provide a response from students’ view regarding which tool they like the most and consider them most learning. Simulation is seen as the most learning tool by Jennings (2002, p.665) but does not comment if it is the most liked tool as well. Looking at the tables from 5.10 to 5.14 we can observe that the correlation is strongest in table 5.13 which displays results for simulation.

**Table 5.10 Correlations between Most learning and most liked: Class Lectures**

<table>
<thead>
<tr>
<th>Most learning: Class Lectures</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
<th>Most Liked: Class Lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most learning: Class Lectures</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>82</td>
<td>.639**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.639**</td>
<td>.000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>82</td>
<td>82</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
### Table 5.11 Correlations between Most learning and most liked: Guest Lectures

<table>
<thead>
<tr>
<th></th>
<th>Most learning: Guest Lectures</th>
<th>Most Liked: Guest Lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td>1</td>
<td>.528**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.528**</td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>82</td>
<td>82</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

### Table 5.12 Correlations between Most learning and most liked: Group Discussion

<table>
<thead>
<tr>
<th></th>
<th>Most learning: Group discussions</th>
<th>Most Liked: Group discussions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td>1</td>
<td>.482**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.482**</td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>82</td>
<td>82</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

### Table 5.13 Correlations between Most learning and most liked: Simulations

<table>
<thead>
<tr>
<th></th>
<th>Most learning: Simulations</th>
<th>Most Liked: Simulations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td>1</td>
<td>.765**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.765**</td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>82</td>
<td>82</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
From tables 5.10 to 5.14 we can observe that all correlations are positive and lying in the range of moderate correlation (0.3 to 0.7). The correlation between most learning and likeability of class lectures was 0.639, for Guest Lectures 0.528, for Group Discussions 0.482, for simulations 0.765 and for self study 0.621. Simulation is the only tool which has a strong positive correlation (0.765) since according to Pearson’s coefficient strong positive correlations lie in the range of 0.7 to 1. Rest of the tools have correlation in moderate range (0.3 to 0.7). Simulation was the highest correlated and meant that according to student perceptions not only did they like the simulation the most but also consider simulation the most learning of other options. Therefore, we reject null hypothesis $H_0$, since $p<.001$ and accept alternate hypothesis $H_1$ as relationship is significant. We conclude that there is positive, strong and highest correlation in perception of students regarding likeness and learning with regards to simulation.
5.3. The Effective Simulation Model:

The second deliverable of the analysis chapter apart from analyzing the findings was to build a model which also takes into consideration the analysis done on previous pages. Therefore in this part we will build the model in light of literature, theories of learning and empirical analysis from the study. One important point from theoretical view is that we have identified various theories which can serve our purpose of generating the model but for instance problem based theory and constructivism theory are inherently different in terms of their ontological and epidemiological origins. For example while problem based theory focuses that knowledge can be put in a box and can be exactly understood at receivers end, constructivism theory follows a personal interpretation/understanding at the receivers level. However, still having different origins of epistemological ontological considerations we can use them for the purpose of our analysis. Therefore in the following diagram, first the model is displayed and then the commentary exist for the reader in order how to understand and interpret this model.

Figure 5.4 An effective model for simulation design from educational perspective
Figure 5.4 displays a proposed model that reflects some necessary elements for an effective simulation for educational use. To develop this model we have used some previous studies on the topic of simulation undertaken by various authors and empirical findings from this study. For the ease of understanding and reminding the reader we will discuss individually the three parts, most of which has been explained in the literature review.

The overall goal of the simulation in education is to provide higher learning. In relation to a simulation which is usually given in a group or team based setting, it is necessary that the simulation qualifies the requirements for encouraging team work. It should be challenging enough to require the students to utilize critical application of learnt theories and principles. It should encourage decision making and strategic planning should be reflected.

Through our study we found that a simulation can become ineffective in delivering its goals especially if the teachers fail to assess individual’s performance in a group or team based setting. This fact was reflected in empirical findings where majority of the students felt that teachers cannot assess their individual performance when the simulation is a team based exercise. Furthermore, while simulation outlines that there is no clear way or right answer to reach the objective however, there should be clear objectives and benchmarks ascertained which are to be pursued by the students. Lastly, the skills and information required for using the simulation and the dynamics of it must be clear and easy to understand. Considering the view of Sweller (1998) and the Cognitive load theory (discussed in chapter three) there should be considerations to avoid a cognitive overload of information. There should be better understanding of students novice-expert skills on using the simulation, schemas must be properly identified as to how much and at what juncture of time the information is to be disseminated. Too much information at the time of playing the simulation can easily cause a cognitive overload which effects learning negatively. Simulations should be able to provide an environment which should limit as much as possible the overloads pointed out by John et al. (1998) which are intrinsic overloads, extraneous overloads and germane overloads that were discussed in detail in chapter three.

For a simulation to be effective the nature of it should be a fun and gaming activity which motivates learning. The greater the ease to use, greater is the interest of the students in completing the simulation. The simulation should be complex enough to replicate real life situations to be more realistic and representative of real life settings. This point gets further support from the Transfer learning theory (discussed in chapter three) in which Perkins & Salomon (1992) outline that for the purpose of learning, the matter should be of considerable importance and also as pointed out by Anderson et al. (1996) students should feel certain amount of realism in the matter with respect to its connection with the real world. Furthermore, from Adobor & Daneshfar (2006) empirical evidence it was concluded that the more is the level of realism of scenario(s) in the simulation, greater will be the learning. The easier it is to use and understand the simulation, the greater will be the learning. Similarly the greater the task conflict, lesser will be the group think phenomenon and greater will be the creativity in proposing alternatives for completing the simulation.
Represented in the model, the red boxes as also indicated in figure 5.5 below fits with our practical contribution since the results from hypotheses 1, 2 and 4 are the basis of addition to the model. Here we tend to upgrade the model with our findings. We believe that the three points added to the model are generalizable and will remain stable with very low variability in case of if further studies are conducted. The results from hypotheses show, the greater the student likeness of simulations in general, greater will be the learning. The more the excitement of taking a simulation as a part of learning in a module the more fun activity simulation will be perceived which ultimately contributes to higher learning. Similarly the higher is the excitement and experience of taking the simulation the greater will be the overall learning experience from the simulation activity. These points are the contribution from our study in the overall model.

To conclude, it can be said that the above model can be used as a guide in deciding some variables at least at the introductory levels of a simulation which is to be introduced to the students. The model’s principles can be applicable on any simulation in educational perspective regardless of the scope of complexity.
6. Conclusion:
This research was focused on the task of exploring the perceptions of students who undertook simulation as a part of pedagogy tool during their university education at Umeå Business School. As reported in previous chapters that studies on this topic from Swedish perspective did not exist, so this study fills the gaps in the research literature.

The previous chapters provided knowledge about topics such as what business simulation is, how it has evolved over time. How it has been used historically for the purpose of education, whether it is effective to use simulation for imparting education by the teachers, experiences of use of simulation in business schools active in different countries. Specifically it has addressed what were the perceptions of students who undertook a simulation at Umeå School of Business (USBE). According to student’s perception what is the value of using simulation as a mode of education. It also provides a basic model for an effective simulation in light with previous studies and empirical findings collected through the surveys.

A quantitative study was undertaken on a qualified sample of 82 respondents. This provided empirical findings for the purpose of reporting student perceptions about their use of simulation. Analysis of these empirical findings showed that:

- Through this research we found that 94% of the respondents were excited about having a simulation as part of the module. Teachers can use simulation effectively since student perceive simulations as practical learning, learning through a gaming approach, an exercise that replicates realistic environment in class room setting etc. Considering the Constructivism learning theory discussed in chapter three where Bruner (1966) discusses active learning derives from students’ ability of findings solutions to the problem. Here the implications for the teachers would be to motivate students to find solutions to the issue covered in the simulation on their own. This empowerment of reaching to the solution in any way deemed fit by the student can provide motivation for learning. This motivation can be used for encouraging learning in modules which require practical use of concepts such as operations, supply chain, logistics, marketing, project management modules etc.

- 88% students feel that simulations are learning experience while being a bit challenging at times. This feeling of simulation being challenging can be used as a strength for the purpose of improved learning in the sense that Problem based learning approach (discussed in chapter three) and as pointed out by (Maricopa Center for Learning & Instruction, 2011) that for the purpose of learning, students should be allowed to comprehend challenging tasks where they use their own decision making and own knowledge for problem solution. Here the role of the teacher is to provide guidance only rather than help in solution of the issue. Furthermore, the theory outlines that for the purpose of learning if there is an open ended solution (i.e. there is no right or specific way to achieve the solution) it serves as a driving force for learning. Simulations provide an opportunity to explore the impact of diverse ideas in restricted domains that can be used as alternatives for problem solution. It encourages the students to use their own knowledge to make decision and feel the impacts of those decisions. Even if the simulation is a bit challenging, it can still lead to more learning if this approach is adopted.

- If we consider the retention level of learnt concepts from simulation then 44% respondents believe that retention level of concepts learnt from simulation is high. About 48% feel the retention level of learnt concepts and experiences through
simulation is medium. According to an assessment of learning from various methods (NDT Resource Center, 2011) points out the average percentage retention through the use of multiple learning methods according to which class lectures account for the least retention (5%), reading (10%), audiovisual (20%), demonstration (30%), discussion Group (50%), practice by doing (75%), teaching others / immediate use of learning (90%). Similar are the findings of Randel et al. (1992) who concluded that retention of learnt concepts from simulation is highest compared to other tools. Keeping this in mind, teachers can use simulations to teach concepts which are difficult to understand and retain by using traditional tools such as class lectures, group discussions etc.

- However teachers must also be certain to minimize or avoid potential issues that leave a simulation greatly ineffective in reaching desired goals. Issues like time pressure to complete the scenario, some simulation being too long to complete, requirement of too much information for how to perform the activities, being too complex and less user friendly can fail a simulation reaching the desired goals. Another important point which can minimize student satisfaction of learning from simulation is the criteria’s of grading a group or team based simulation activity. In this research 49% respondents feel that teachers cannot assess the individual performance of the students in a group simulation. In contrast only 28% feel that teachers can correctly assess individual performance for grading in a simulation which is team based. Therefore, a teacher when giving a simulation should clearly specify benchmarks and criteria’s for grading. This will provide students with some objective grading criteria that can improve student satisfaction from the exercise of undertaking a simulation.

- Our findings are consistent with the findings of Ebner & Holzinger (2007) since 94% respondents feel that simulation provides motivation for learning in a module. In general, learning motivation declines as time passes on and according to Ebner & Holzinger (2007) who are of the view that, motivation to learn declines with time during the module and simulation is a tool that can help maintain that balance. At times in modules there is a need to have a balance between various pedagogy tools such as class lectures, group discussions etc. Simulations can be used at calculated times when the teacher feels that the students are reaching saturation and there is over emphasis of one tool. 77% respondents perceive simulation as a more learning method compared to class lectures. Students consider simulations the most learning tool of all when compared with class lectures, group discussions, self study and guest lectures. Furthermore, simulation is the most liked tool as perceived by the students. So over emphasis on class lectures may not be a wise decision after all we found that 94% perceive simulation as a learning tool which is a fun way of learning. About 88% accept that simulations are challenging in learning perspective due to the scenario and dynamics of the simulation. Considering these points’ teachers can find a suitable mix of tools to keep the learning motivation of students stable throughout the module.

- Our analysis builds up on the work of Adobor & Daneshfar (2006) who contributed findings for the proposed model in figure 5.4. This study reveals several relationships amongst the studied variables. Analyses of these variables reveal that students who would like to use simulation again, will register a module which provides simulation. We found that there is a strong positive correlation between excitement and fun because students, who perceived simulation as exciting, found it a fun way of learning. Moreover, when there is excitement about taking a simulation, this excitement leads to
the feeling that the module was a learning experience. Lastly we found that student likeness and learning from simulation is positively and strongly related. This means that compared to other tools there is more likeness for simulation amongst students and they perceive it as most learning tool compared to class lectures, guest lectures, self study and group discussions. These findings can be used by teachers to select or develop simulations which adhere to these points in order to be effective in delivering the goals or learning outcomes that were a part of the module. The findings were used to build the model further as outlined in figure 5.5.

Implications:

The results from this research adds importance that teaching through the use of simulation should be given due attention from the teachers. Past studies and ours show the benefits and advantages of using this approach. The perceptions of students in general as explored in this study show a strong interest in having simulation, seen as more learning compared to other pedagogy tools mentioned earlier. Therefore, there should be no reluctance in actively and frequently using simulations in education as are used in American universities.

Contribution:

This study has both theoretical and practical contribution. The theoretical contribution exists in the form of development of a basic model for an effective simulation which is an addition to the literature. The model was developed on the basis of previous studies and empirical findings collected through the surveys from our study.

Furthermore, on the theoretical side this study contributed in the sense that it provided the knowledge what business simulation is, how it has evolved over time, how it has been used historically for the purpose of education, whether it is effective to use simulation for imparting education by the teachers, experiences of use of simulation in business schools active in different countries.

The practical contribution of this study is that it specifically provides answers relating to what were the perceptions of students who undertook a simulation at Umeå School of Business (USBE). It also provides the perceptions held by students regarding what is the value of using simulation as a mode of education. From teaching perspective teachers can use the findings of this empirical study and the proposed model to design modules keeping in view the perceptions of students. This contribution will allow the teacher to utilize the benefits of simulation and to provide students a better learning experience.

This study, considered from both theoretical and practical sides can be used to motivate the use of simulations in business education by exploring the advantages and issues of incorporating simulations as part of module development at university level.

Further Research:

- Research can be conducted to quantify the efficiency of simulations, measuring the learning potential by comparing learning simulations to other tools such as class lectures, self study etc.

- A longitudinal study can be conducted where efficiency of simulations in learning can be measured with comparing results from learning without the use of simulation.
7. List of References:


Oxford Brookes University. (n.d.). Learning and Teaching Resources and Support: [http://www.brookes.ac.uk/services/ocsld/resources/theories.html#action](http://www.brookes.ac.uk/services/ocsld/resources/theories.html#action) [Retrieved March 27, 2011]


APPENDIX
We are the students of Umeå Business School and this research is for an academic thesis. The information provided by the respondents will be kept confidential and will not be used against the respondents in any regards.

Survey Questionnaire

FORM CODE__________

RESPONDENT NAME ________________________________________________ E-MAIL ________________________________________________ (Optional)

(Optional)

(Please CIRCLE the relevant answer(s), you can choose multiple answers as well where necessary)

Have you ever taken a simulation in education

• YES • NO

If Yes then how many times ________ and at what level ________________ (e.g. Masters/Bachelors etc)

1. In which module(s) have you taken simulation? __________________________

2. If taken multiple simulation, which were the modules in which you liked it (MARKSTRAT was the simulation in Advanced Market Analysis, DECISION BASE in Entrepreneurship & Growth, etc)

__________________________________________________________________________

3. When reading the word simulation what is the first thing that comes to your mind __________________________________________________________________

4. In general were you excited to know about a simulation in the module?

• Yes I was excited • Excited to some extent • No I was not excited

5. I think simulations provide motivation:

<table>
<thead>
<tr>
<th>For module registration</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning in the module</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

6. I think simulations are:

<table>
<thead>
<tr>
<th>Fun way of learning</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenging</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Learning experience</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

7. Please rank the following methods which you think are the most learning (1=most, 5=Least)

   Class lectures____, Guest Lectures____, Group discussions____, Simulations____, Self study____

8. Please rank the following methods of instructions which you like the most (1=most, 5=Least)

   Class lectures____, Guest Lectures____, Group discussions____, Simulations____, Self study____

9. In general do you think simulation leads to more learning compared to

<table>
<thead>
<tr>
<th>Class lectures</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Guest speakers</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Group discussions</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>
10. What is\(\text{s}\) the best thing(s) you like about simulation

___________________________________________________________________________

11. What is\(\text{s}\) the worst thing(s) you dislike about simulation

___________________________________________________________________________

12. Do you think there was too much information to retain on how to play the simulation

<table>
<thead>
<tr>
<th>Starting of the module</th>
<th>During the module</th>
<th>End of the module</th>
<th>Not sure</th>
</tr>
</thead>
</table>

13. Do you think the teacher can correctly assess the individual student’s performance for grading

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

14. Do you think simulations should be made part of every module

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

15. Do you think simulations should be given to students at the:

<table>
<thead>
<tr>
<th>Starting of the module</th>
<th>During the module</th>
<th>End of the module</th>
<th>Not sure</th>
</tr>
</thead>
</table>

16. Were you satisfied with your performance in the simulation as a part of a group

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

17. Would you like to use simulation again

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>May be</th>
</tr>
</thead>
</table>

18. Do you think simulation alone can provide all the learning which is a part of the module

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>May be</th>
</tr>
</thead>
</table>

If No, then in your opinion what is the ideal combination for learning utilizing simulation with (select your answers from Class lectures, Guest Lectures, Group discussions, Self study, you can select multiple answers)

Simulation + _________________________________________________________________

19. I think the retention level of the concepts covered in the simulation is

- High, I can recall mostly all the concepts covered in simulation
- Medium, I can recall only some concepts covered in simulation
- Low, I can recall only a few concepts covered in simulation

20. In a simulation which factors do you think are most important (1=most, 5=Least)

Enjoy ability_____ , Ease of use_____ , Realistic_____ , Encourages teamwork_____ , Learning_____

Thank you, very much, for you time and consideration to complete this survey ☺