Evaluating the role of simulation-based experiential learning in improving satisfaction of finance students

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Abstract

This study evaluates the impact of implementing a simulation-based experiential learning method on student satisfaction. We develop a simulation-based experiential learning activity and use it in teaching a postgraduate finance course to engage students in the learning process and enable them to develop deeper understanding of the finance theories, models and concepts covered in the course. We then use a survey to collect data from students and use a Structural Equations Modelling technique to test our research hypotheses. Our results show that the simulation-based experiential learning activity can provide students with a hands-on experience of the real-world practice of finance. This helps students to engage in the learning process and become active learners who utilize deep learning strategies. Consequently, learners become more satisfied with their learning experience.

Keywords: Experiential Learning Theory; Simulations; Student Approaches to Learning; Student Satisfaction; Financial Education

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1. Introduction

Finance curriculum is usually criticised for being vocational and failing to bridge the gap between finance education and the practice of finance. For example, studies show that traditional finance teaching methods fail to instill the required practical decision making and problem solving skills in students (Saunders, 2001). Teaching resources used with finance students including textbooks and lecture notes are also criticised for being too theoretical. Although these resources can help students to obtain sufficient knowledge, many finance students still find it difficult to learn finance concepts and even more difficult to apply them in real world situations (Vihtelic, 1996). The main reason behind this is that finance students learn abstract theories, models and concepts without an experience of how these concepts are applied in the real world (Krishnan et al., 1999). Consequently, students may not acquire the right balance of knowledge, application, and experience from their studies which limits their employability chances.

In response to these criticisms, experiential learning has emerged as an effective learning method to enable students to acquire real-world experience relevant to the practice of finance. Experiential learning allows students to engage in an experience that enables them to apply their knowledge which allows students to actively participate in the learning process (Lewis and Williams, 1994). Experiential learning has been applied in different fields. For example, it is used in medical and nursing education to educate students about expected real clinical situations (Hong and Kim, 2011). Experiential learning has also been proved very useful in accounting education (Dellaportas and Hassall, 2013) and in auditing education (Chiang et al., 2021) to enable students to develop deeper understanding of abstract concepts they acquire during study and to apply them to real world experiences they encounter in their professional career.

In this study, we evaluate the impact of implementing the experiential learning method in teaching a postgraduate finance course on student satisfaction. We use a simulation-based experiential learning activity to engage students in the learning process and enable them to develop deeper understanding of the finance theories, models and concepts covered in the course. Using simulations in learning has the potential to provide a suitable environment for students to make decisions to solve specific problems and to evaluate the outcome of their decisions. This experience helps students to develop their problem solving skills (Farashahi and Tajeddin, 2018). Several studies show that using simulation-based experiential learning in finance courses has the potential to increase student motivation and engagement (Jankowski and Shank, 2010; Weiser and Schug, 1992), improve student learning (Helliar et al., 2000), enhance student learning and satisfaction (King and Jennings, 2004), boost students' perceived learning (Wolmarans, 2005), and can positively enhance students' overall knowledge and experience (Dolvin and Pyles, 2011). However, despite the effectiveness of simulations, their use in finance and investment courses is limited (Mukherji et al., 2018).

This study contributes to the literature on finance education in several ways. First, we use the Experiential Learning Theory (Kolb, 1984) to provide an effective learning method in the context of finance education. Second, we develop a simulation-based experiential learning activity that can be utilised in different finance and other related courses. Third, we evaluate the impact of this simulation-based experiential learning activity on student satisfaction to understand how this approach affects student experience. Fourth, we use a research design based on structural equations modelling to evaluate not only whether the simulation-based experiential learning activity affects student satisfaction, but also why this effect happens. This enables faculty to learn more about the overall effectiveness of simulation-based experiential learning in finance courses.

The remainder of this paper is divided as follows. Section 2 provides the theoretical framework and hypotheses development. Section 3 discusses the methods used to test our research hypotheses. Section 4 presents the main results and discussion. Section 5 provides a conclusion.

2. Literature Review and Hypotheses Development

2.1. Student Satisfaction

Student satisfaction is a widely debated issue in higher education mostly due to the lack of a universal method to measure student satisfaction. A wide range of literature argues that satisfaction depends on expectations and attempts to understand the formation of expectations as a means to positively influence satisfaction. Shank et al. (1996) show that student expectations of university services can actually exceed those of the faculty and can differ between universities. Similarly, Patterson (2000) study the relationship among perceived performance, disconfirmation of expectations, and satisfaction. Their results are relevant to university students as they find that this relationship is moderated by the customer's experience with the service and situational conditions. Additionally, applying the findings of Anderson and Fornell (2000) and Yi (1993) in higher education, it seems that the difficulty of evaluating the perceived quality of the education service leads to greater influence of expectations on student satisfaction.

On the other hand, another strand of literature argues that the difficulty of evaluating the quality of the educational service can effectively encourage students to focus on class environment and faculty performance and not necessarily imply that expectations will be the defining factor of satisfaction. For example, some studies show that some students have low expectations about the education service and therefore performance becomes the most important factor in determining their satisfaction (Hartman and Schmidt, 1995). Similarly, Halstead et al. (1994) show that alumni satisfaction with higher education depends on the intellectual environment in which they learn and the employment preparation they receive. Other studies show that the perceived quality of education mediates the relationship between expectations and satisfaction (Anderson and Sullivan, 1993; Kristensen et al., 1999). In the same vein, Athiyaman (1997) proposes a model of perceived service quality in higher education institutions which shows that perceptions of quality highly influence student satisfaction.

2.2. Student Approaches to Learning Theory

The student approaches to learning theory considers the effect of learning environment on the level of learning. The pioneering work on this theory by Marton and Säaljö (1976) show that students can follow two different approaches in learning: deep and surface. Under the deep approach to learning, students actively engage with the material which improves not only their ability to understand but also their ability to apply the basic knowledge that that they learn. On the other hand, students who follow a surface learning approach focus more on meeting the course requirements and therefore use low-level cognitive skills to memorize main ideas and important parts of the material.

In contrast to the deep learning approach, the surface approach is relatively passive and fails to motivate students to engage in the thoughtful reflection required to enable deeper understanding of the material and successful application of the information included in this material (Biggs, 1987).

Further work on learning approaches has shown that deep and surface approaches differ based on the motivation level and the strategy involved in the learning process. In particular, motivation is related to the reasons for students to approach a specific learning task, and strategy is related to the way in which students complete this task. Obviously, the two concepts are interrelated. Motivation can be extrinsic which encourages utilizing surface strategies and leads to surface learning or intrinsic which encourages utilizing deep strategies and enables deep learning Biggs and Tang (2011). When students perform an activity only to achieve a grade or meet instructor's requirements, they are extrinsically motivated. Surface learners, then, focus on meeting the minimum requirements of a task and fail to utilize high-level cognitive skills. In contrast, when students are intrinsically motivated they focus on how interesting and challenging the task is more than they focus on the demands of the assessment. These concepts of motivation and strategy were used by Biggs (1987) to develop a the main measure in the literature of student learning approaches using a Study Process Questionnaire.

Based on the pedagogical literature reviewed above, we propose the following hypotheses:

Hypothesis 1a: Deep approaches to learning are positively associated with student satisfaction.

Hypothesis 1b: Surface approaches to learning are negatively associated with student satisfaction.

2.3. Experiential Learning Theory

Experiential learning can be defined as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984). Experiential learning, thus, provides learners with tangible learning experiences rather than abstract knowledge (Lai and McNaughton, 2009). In his seminal work, Kolb (1984) developed a model consisting of four stages that represent the building blocks of experiential learning: concrete experience; reflective observation; abstract conceptualisation; and active experimentation. This model is illustrated in Figure 1. The concrete experience stage is where the learner experiences an activity. The learner then reflects on this activity or experience during the reflective observation stage. Experiential learning, thus, exposes learners to tangible learning contexts rather than abstract knowledge (Lai and McNaughton, 2009). In the abstract conceptualization stage, the learner attempts to conceptualize a theory or model based on the reflective observation. This stage might also involve the learners adjusting their current conceptual understanding of theories and models based on recent understanding of the concrete experience. In the active experimentation stage, the learner tests the theory or model using data. The tests undertaken in the active experimentation stage result in a concrete experience in the next learning cycle. Kolb (1984) show that this concrete experience not only can be used to validate and test abstract concepts, but also can provide an opportunity to test the implications and validity of understanding developed during the learning process. In other words, Kolb (1984) presents the learning process as a cycle that starts from and ends at the concrete experience. This learning cycle can be repeated where each cycle involves a higher level of depth and complexity in learning (Siegel et al., 1997) and due to being a continuous process it can be seen as a spiral of cycles (Healey and Jenkins, 2000).

Based on the pedagogical literature reviewed above, we propose the following hypotheses:

Hypothesis 2a: Simulation-based experiential learning activities are positively related to a deep approach to learning.

Hypothesis 2b: Simulation-based experiential learning activities are negatively related to a surface approach to learning.

Hypothesis 3: The effect the simulation-based experiential learning activities on student satisfaction is mediated by the students' approach to learning.

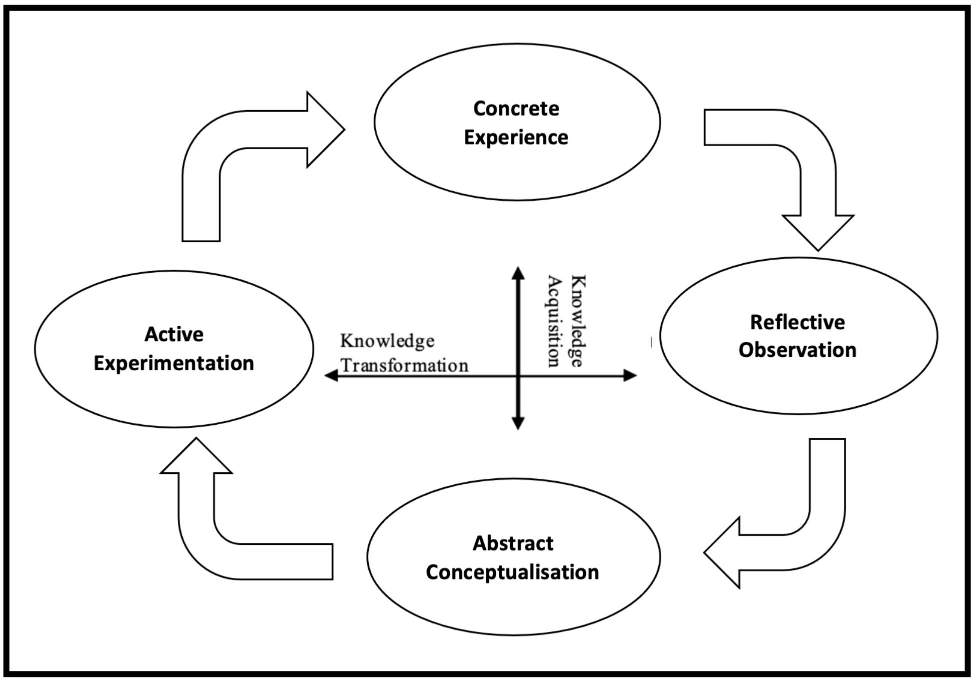

Figure 1: The Experiential Learning Cycle. Adopted from Kolb (1984).

3. Methods

3.1. The Stock Market Analysis Project

The Stock Market Analysis module was used in this study. This module provides an introduction to the modern finance theory and its applications to equity investing. The module has two main goals. The first goal is to develop students' knowledge and understanding of the main theories and methods of equity valuation. The second goal is to develop students' skills in stock portfolio management by enabling them to make investment decisions based on their understanding of the theories and methods of equity valuation. We aimed to achieve these two goals using a simulation-based experiential learning approach in which the students are actively engaged. To this end, we designed an experiential learning activity represented in a semester-long project that students need to complete using the MarketWatch Virtual Stock Exchange (VSE). This platform simulates the stock market and provides a live trading and investing experience similar to what happens in the real world, albeit with virtual money instead of real money. In this project, the students need to identify and analyse some individual stocks based on their understanding of the theories and methods of equity valuation. Then, they make the appropriate investment decisions to build and manage their own stock portfolio on the VSE. Finally, they write a report about the project to reflect on their investment decisions and the analysis that underlined these decisions.

3.2. Survey Design and Measures

At the end of semester, students were asked to fill an online questionnaire consisting of four sections. The questionnaire included scales for the four main variables included in the study where each scale included a number of items that were ordered randomly. All items and sections of the questionnaire are presented in Appendix 1.

Simulation-based Experiential Learning Stages Scale. The first section of the questionnaire aimed to capture students' perceptions of how well the stock market analysis project, our simulation-based experiential learning activity, included each of the four stages of the experiential learning cycle of Kolb (1984). To this end, we utilised a scale developed by Young et al. (2008) based on the literature on experiential learning (e.g., Kolb (1985)'s Learning Styles Inventory and Kember et al. (2000)'s Level of Reflective Thinking scale). The scale includes four sub-dimensions that cover concrete experience, reflective observation, abstract conceptualization, and active experimentation. In total, the scale includes 12 items divided into 3 items for each sub-dimension.

Student's Approaches to Learning Scale. The second and third sections of our questionnaire aimed to measure students' approach to learning. To this end, we utilised the two-factor Study Process Questionnaire developed by Biggs et al. (2001). The scale consists of two dimensions: Deep Approach (10-item) and Surface Approach (10-item). Each dimension is further divided into two sub-dimensions: motivation (5-item) and strategy (5-item). We modified the scale's items to consider the the stock market analysis project, our simulation-based experiential learning activity.

Student's Satisfaction Scale. The fourth section of our questionnaire aimed to measure student's satisfaction. To this end, we utilise the UK's National Student Survey (NSS) (Office for Students, 2021). The NSS is designed to collect feedback from final-year university students to measure their satisfaction with their courses of study (Cheng and Marsh, 2010). We use a modified version of the Core NSS consisting of 20 items which cover the teaching and learning (8 items), feedback and support (4 items), organisation and management (3 items), and overall satisfaction (5 items).

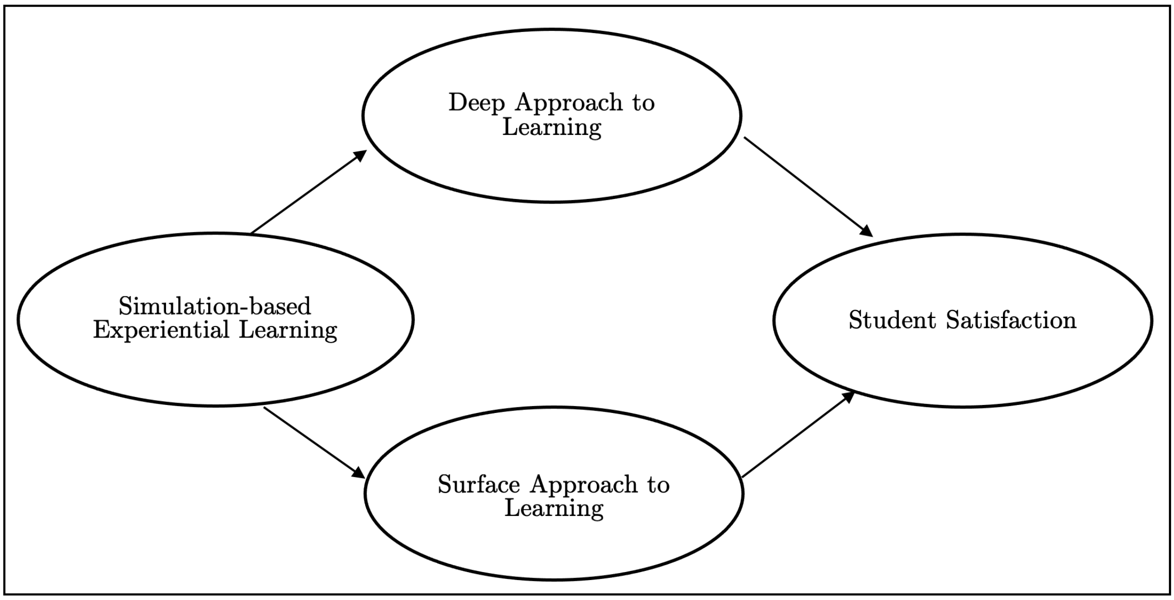

Figure 2: The conceptual model of the effect of simulation-based experiential learning on student satisfaction

3.3. Model

In order to test the hypotheses proposed in this study, we build a conceptual model as illustrated in Figure 2. The main independent variable in this model is the simulation-based experiential learning. The main dependent variable in this model is the student satisfaction which is modeled as a function of the student's approaches to learning including the deep approach (Hypothesis 1a) and surface approach (Hypothesis 1b). Both deep and surface approaches are also considered dependent variables and are modeled in turn as functions of simulation-based experiential learning (Hypotheses 2a and 2b). Overall, the model effectively evaluates the indirect effect of simulation-based experiential learning on student satisfaction (Hypothesis 3).

Furthermore, to examine the proposed model and relationships, we use structural equation modeling (SEM). Using SEM to fit our conceptual model to data has several benefits. First, SEM is suitable for complicated models that incorporate multiple dependent variables or those that use variables measured by multiple indicators as in the case of survey data (Cheon and MacKinnon, 2012). Another benefit is that SEM makes use of a measurement model to enhance the reliability of the measured constructs, and a structural model to examine the possibility of indirect interrelationships among the constructs (Cheon and MacKinnon, 2012). Also, SEM fits the model to data simultaneously to estimate the model parameters which enables us to control for and partial out other relationships that might influence the impact of simulation-based experiential learning on student satisfaction and reduces the need for controlling variables (Iacobucci, 2008).

Furthermore, in order to assess the model's goodness of fit to the data, we use four fit statistics as suggested by Kline (2015). The model chi-square and the relative chi-square to degrees of freedom ratio (CMIN) which assess the overall fit and the discrepancy between the sample and fitted covariance matrices. The chi-square p-value should be > 0.05 and the value of CMIN should be < 3. The Root Mean Square Error of Approximation (RMSEA) is a parsimony-adjusted index. It should be < 0.08 and values closer to 0 represent a good fit. The Comparative Fit Index (CFI) compares the fit of a target model to the fit of an independent, or null, model. It should be > 0.90. The Standardized Root Mean Square Residual (SRMR) represents the square-root of the difference between the residuals of the sample covariance matrix and the hypothesized model. It should be < 0.08.

4. Results and Discussion

4.1. The Sample and Data Collection

The sample consists of 117 students studying the Stock Market Analysis course in the academic year 2020/2021. The sample consisted of 57.2% males and 42.8% females. The students were required to undertake the stock market analysis project as described in section 3.1 above. At the end of the semester, students were asked to complete an online survey as explained in section 3.2 above. The response to the survey was voluntary and the survey was designed to maintain the anonymity of participants. The data was collected during January and February 2021. Overall, we received a total of 57 valid surveys. Male and female students accounted for 54.4% and 45.6, respectively. Most participants were in the 20-29 age group.

4.2. Descriptive Statistics

We start with exploring the responses collected using the questionnaire. Table 1 provides detailed descriptive statistics of all the items of the questionnaire. The distribution of responses shows that most respondents either agree or strongly agree (scores 4 and

5) with the majority of items. The main exception is the responses to the items of the surface approach to learning scale where more respondents either strongly disagree or disagree with the items (scores 1 and 2). This is confirmed by the mean value of responses which is higher than 4.05 with relatively low standard deviation for most items indicating strong agreement, while the mean value of the items of surface approach to learning is much lower at a relatively higher standard deviation indicating more disagreement.

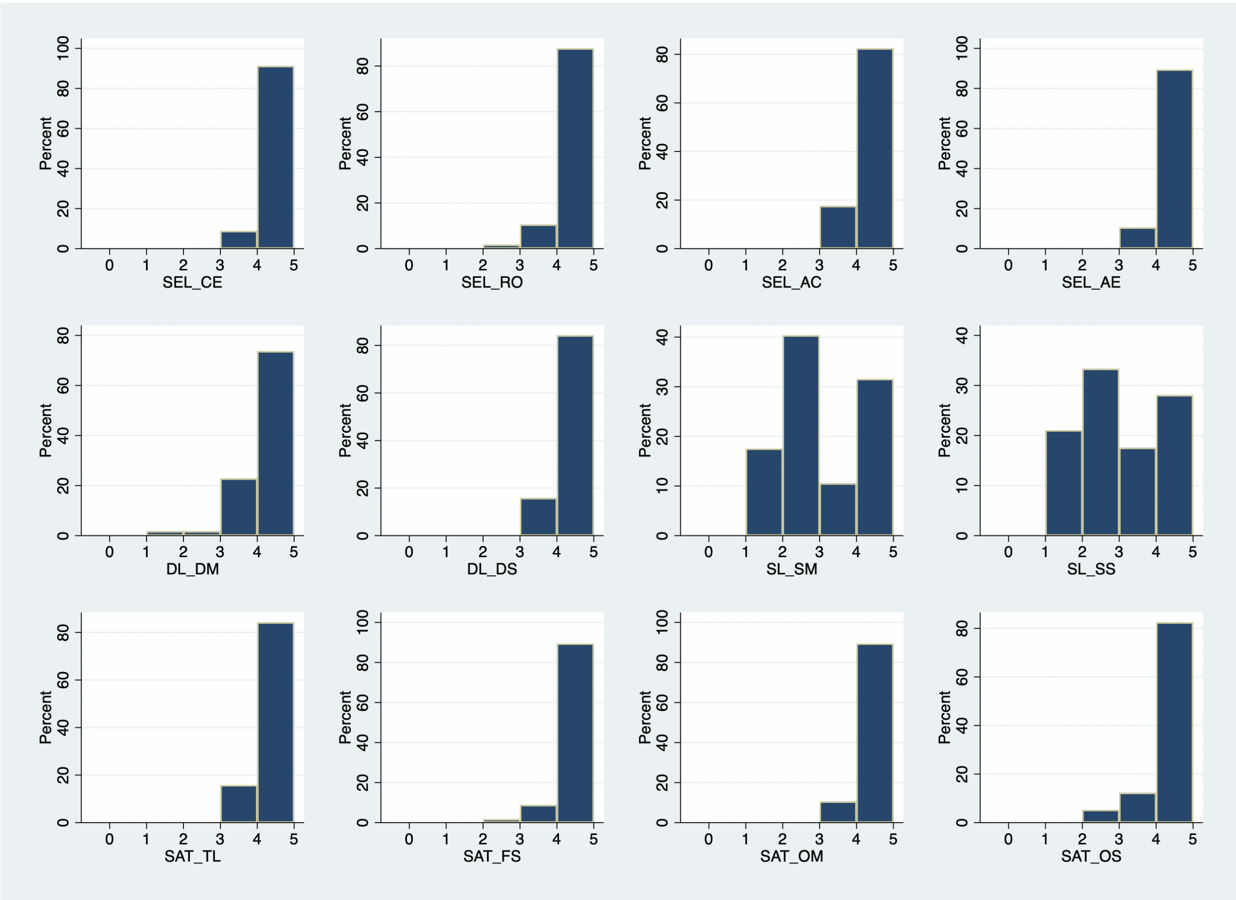

Figure 3: Descriptive Statistics: Histogram of the mean responses of the items included in each one of the sub-scales. N = 57.

To further illustrate the data collected at the scales and sub-scales levels, we provide in Figure 3 a histogram of the mean responses of the items included in each one of the sub-scales. As can be seen, for most scales the responses are clustered in the agreement and strong agreement categories with the main exception being the two sub-dimensions of the surface approach to learning which are more skewed towards disagreement.

Also, Table 2 provides descriptive statistics of the main scales and sub-scales based

Item Number	Description of items	N	Response categories 1	2	3	4	5	Mean	Std. Dev.	α_i	H_j
	Experiential Learning Stages [12 items, $\alpha = 0.94$]										
	Sub Dimension: Concrete Experience [3 items, $\alpha = 0.86$]										
1	The stock market analysis project provided me with a direct practical experience to help understand the module concepts.	57	-	-	3.51%	38.60%	57.89%	4.54	0.56	0.73	0.82
2	The stock market analysis project gave me a concrete experience that helped me learn the class material.	57	-	1.75%	3.51%	42.11%	52.63%	4.45	0.65	0.8	0.76
3	The stock market analysis project presented me with a "real world" experience related to this module.	57	-	-	3.51%	50.88%	45.61%	4.42	0.56	0.86	0.73
	Sub Dimension: Reflective Observation [3 items, $\alpha = 0.79$]										
4	The stock market analysis project assisted me in thinking about what the module material really means to me.	57	-	-	12.28%	35.09%	52.63%	4.40	0.70	0.77	0.66
5	The stock market analysis project helped me relate my personal experiences to the content of this module.	57	-	1.75%	1.75%	56.14%	40.35%	4.35	0.61	0.64	0.72
6	The stock market analysis project aided me in connecting the module content with things I learned in the past.	57	-	1.75%	7.02%	49.12%	42.11%	4.31	0.68	0.73	0.62
	Sub Dimension: Abstract Conceptualization [3 items, $\alpha = 0.84$]										
7	The stock market analysis project required me to think how to correctly use the terms and concepts from this class.	57	-	-	5.26%	43.86%	50.88%	4.45	0.59	0.88	0.63
8	The stock market analysis project caused me to think how the class concepts were inter-related.	57	-	-	12.28%	42.11%	45.61%	4.33	0.69	0.68	0.8
9	The stock market analysis project made me organize the class concepts into a meaningful format.	57	-	1.75%	8.77%	36.84%	52.63%	4.40	0.72	0.76	0.73
	Sub Dimension: Active Experimentation [3 items, $\alpha = 0.85$]										
10	The stock market analysis project made it possible for me to try things out for my self.	57	-	-	5.26%	35.09%	59.65%	4.54	0.59	0.81	0.68
11	The stock market analysis project permitted me to actively test my ideas of how the module material can be applied.	57	-	1.75%	8.77%	40.35%	49.12%	4.36	0.72	0.82	0.73
12	The stock market analysis project allowed me to experiment with the module concepts in order to understand them.	57	-	-	5.26%	35.09%	59.65%	4.54	0.59	0.72	0.75
	Deep Approach to Learning [10 items, $\alpha = 0.91$]										
	Sub Dimension: Deep Motivation [5 items, $\alpha = 0.91$]										
13	The stock market analysis project gave me a feeling of deep personal satisfaction.	57	1.75%	5.26%	12.28%	47.37%	33.33%	4.05	0.91	0.89	0.72
14	The stock market analysis project helped me create questions that I wanted answered.	57	-	-	10.53%	43.86%	45.61%	4.35	0.66	0.9	0.69
15	The stock market analysis project made me work hard because I found the material interesting.	57	1.75%	-	3.51%	49.12%	45.61%	4.36	0.72	0.88	0.79
16	The stock market analysis project was at times as exciting as a good novel or movie.	57	1.75%	3.51%	12.28%	52.63%	29.82%	4.05	0.85	0.87	0.8
17	The stock market analysis project was interesting once I got into it.	57	-	-	10.53%	43.86%	45.61%	4.35	0.66	0.88	0.79
	Sub Dimension: Deep Strategies [5 items, $\alpha = 0.88$]										
18	The stock market analysis project provided me with enough work on the topic so I could form my own conclusions.	57	-	1.75%	7.02%	56.14%	35.09%	4.24	0.66	0.87	0.58
19	The stock market analysis project caused me to look at most of the suggested readings that pertained to the activity.	57	-	-	3.51%	57.89%	38.60%	4.35	0.55	0.86	0.64
20	The stock market analysis project caused me to spend time relating its topics to other topics which have been discussed in different classes.	57	-	-	1.75%	61.40%	36.84%	4.35	0.51	0.84	0.72
21	The stock market analysis project allowed me to test myself on important topics until I understood them completely.	57	-	-	8.77%	50.88%	40.35%	4.31	0.63	0.85	0.65
22	The stock market analysis project's topics were interesting and I often spent extra time trying to obtain more information about them.	57	-	1.75%	7.02%	56.14%	35.09%	4.24	0.66	0.85	0.66
	Surface Approach to Learning [10 items, $\alpha = 0.96$]										
	Sub Dimension: Surface Motivation [5 items, $\alpha = 0.95$]										
23	For the stock market analysis project, it was not helpful to study topics in depth because all you needed was a passing acquaintance with topics.	57	10.53%	24.56%	15.79%	26.32%	22.81%	3.26	1.34	0.94	0.83
24	I was able to get by in the stock market analysis project by memorizing key sections rather than trying to understand them.	57	10.53%	24.56%	19.30%	22.81%	22.81%	3.22	1.33	0.94	0.81
25	For the stock market analysis project there was no point in learning material which was not likely to be on the exam.	57	17.54%	31.58%	12.28%	19.30%	19.30%	2.91	1.41	0.93	0.85
26	I did not find the stock market analysis project very interesting so I kept my work to a minimum.	57	22.81%	35.09%	10.53%	15.79%	15.79%	2.66	1.40	0.93	0.86
27	My aim for the stock market analysis project was to complete it while doing as little work as possible.	57	22.81%	26.32%	10.53%	17.54%	22.81%	2.91	1.51	0.94	0.81
	Sub Dimension: Surface Strategies [5 items, $\alpha = 0.92$]										
28	The stock market analysis project suggests the best way to pass exams is to try to remember answers to likely test questions.	57	28.07%	22.81%	17.54%	15.79%	15.79%	2.68	1.44	0.9	0.81
29	I believe that the instructor shouldn't expect me to spend significant amounts of time on the stock market analysis project if it's not on an exam.	57	26.32%	35.09%	10.53%	12.28%	15.79%	2.56	1.41	0.89	0.85
30	For the stock market analysis project, I restricted my study to what was specifically required as it was unnecessary to do anything extra.	57	22.81%	28.07%	14.04%	21.05%	14.04%	2.75	1.39	0.9	0.79
31	For the stock market analysis project, I learned things by going over and over them until I knew them by heart even if I did not understand them.	57	7.02%	8.77%	15.79%	47.37%	21.05%	3.66	1.12	0.94	0.68
32	For the stock market analysis project, I only applied what was given in class or on the module outline.	57	10.53%	19.30%	24.56%	28.07%	17.54%	3.22	1.25	0.9	0.78
	Satisfaction [20 items, $\alpha = 0.94$]										
	Sub Dimension: Teaching and Learning [8 items, $\alpha = 0.88$]										
33	The module has been intellectually stimulating.	57	-	1.75%	8.77%	45.61%	43.86%	4.31	0.71	0.86	0.54
34	The module has challenged me to achieve my best work.	57	-	1.75%	7.02%	52.63%	38.60%	4.28	0.67	0.87	0.46
35	The module has provided me with opportunities to explore ideas or concepts in depth.	57	-	-	3.51%	57.89%	38.60%	4.35	0.55	0.85	0.59
36	The module has provided me with opportunities to bring information and ideas together from different topics.	57	-	-	-	59.65%	40.35%	4.40	0.49	0.84	0.73
37	The module has provided me with opportunities to apply what I have learnt.	57	-	-	1.75%	50.88%	47.37%	4.45	0.53	0.86	0.57
38	The content of the module has been useful.	57	-	-	3.51%	56.14%	40.35%	4.36	0.55	0.87	0.43
39	The quality of instruction I receive in most of this module have been excellent.	57	-	3.51%	8.77%	54.39%	33.33%	4.17	0.73	0.88	0.44
40	The module has been effectively taught.	57	1.75%	-	10.53%	56.14%	31.58%	4.15	0.75	0.86	0.57
	Sub Dimension: Feedback and Support [4 items, $\alpha = 0.83$]										
41	Assessment methods employed in this module require an in-depth understanding of the module content.	57	-	3.51%	8.77%	56.14%	31.58%	4.15	0.72	0.8	0.62
42	The criteria used in marking have been clear in advance.	57	-	1.75%	5.26%	54.39%	38.60%	4.29	0.65	0.79	0.61
43	I have received sufficient advice and guidance in relation to this module.	57	-	-	8.77%	52.63%	38.60%	4.29	0.62	0.81	0.56
44	Feedback on my work has been timely.	57	-	-	3.51%	42.11%	54.39%	4.50	0.57	0.73	0.8
	Sub Dimension: Organisation and Management [3 items, $\alpha = 0.78$]										
45	The learning outcomes of this module have been clear	57	-	-	3.51%	56.14%	40.35%	4.36	0.55	0.64	0.66
46	The module has been well organised and has been running smoothly.	57	-	-	10.53%	50.88%	38.60%	4.28	0.64	0.73	0.57
47	The workload on this module has been manageable	57	-	-	8.77%	54.39%	36.84%	4.28	0.61	0.75	0.56
	Sub Dimension: Overall Satisfaction [5 items, $\alpha = 0.85$]										
48	As a result of this module, I believe that I have improved my career prospects.	57	-	-	7.02%	54.39%	38.60%	4.31	0.60	0.83	0.62
49	The value-added that I have got from this module is very high.	57	-	7.02%	12.28%	54.39%	26.32%	4.00	0.82	0.87	0.49
50	Overall, I am satisfied with the quality of the module.	57	-	1.75%	5.26%	47.37%	45.61%	4.36	0.67	0.8	0.69
51	All in all, if I had to do it over again, I would enrol on this module.	57	-	5.26%	3.51%	33.33%	57.89%	4.43	0.80	0.81	0.65
52	I am highly likely to recommend this module to a friend or a colleague.	57	-	1.75%	7.02%	28.07%	63.16%	4.52	0.70	0.78	0.77

Table 1: Descriptive Statistics.

on the sum of responses of the items included in each scale and sub-scale. The main observation here is that the deep approach to learning scales have higher mean, lower standard deviation, and higher minimum values compared to the surface approach to learning scales. This indicates that respondents believe that simulation-based experiential learning could encourage the deep approach to learning and discourage the surface approach to learning.

	Items	Obs	Mean	Std. Dev.	Min	Max
Experiential Learning Stages						
Concrete Experience	3	57	13.42	1.58	10	15
Reflective Observation	3	57	13.07	1.68	7	15
Abstract Conceptualization	3	57	13.19	1.77	9	15
Active Experimentation	3	57	13.46	1.68	10	15
Deep Approach to Learning						
Deep Motivation	5	57	21.18	3.27	9	25
Deep Strategies	5	57	21.51	2.48	16	25
Surface Approach to Learning						
Surface Motivation	5	57	14.98	6.39	5	25
Surface Strategies	5	57	14.89	5.83	5	25
Student Satisfaction						
Teaching and Learning	8	57	34.51	3.64	28	40
Feedback and Support	4	57	17.26	2.08	11	20
Organisation and Management	3	57	12.93	1.52	9	15
Overall Satisfaction	5	57	21.44	2.84	12	25

Table 2: Descriptive Statistics of the main scales and sub-scales based on the sum of responses of the items included in each scale and sub-scale.

Finally, we present in Table 3 a correlation matrix between the main and sub-scales. This matrix shows that the correlation coefficients between the sub-scales of the surface approach to learning and other scales are very low and are not statistically significant. We can also infer from this matrix an initial indication of the strong association between simulation-based experiential learning and both the deep approach to learning and student satisfaction.

	CE	RO	AC	AE	DM	DS	SM	SS	TL	FS	OM	OS
Concrete Experience	1											
Reflective Observation	0.74*	1										
Abstract Conceptualization	0.69*	0.79*	1									
Active Experimentation	0.74*	0.64*	0.76*	1								
Deep Motivation	0.55*	0.75*	0.69*	0.65*	1							
Deep Strategies	0.59*	0.68*	0.71*	0.62*	0.59*	1						
Surface Motivation	0.04	0.09	0.05	0.06	0.05	0.27	1					
Surface Strategies	0.09	0.10	0.05	0.01	0.05	0.2	0.89*	1				
Teaching and Learning	0.60*	0.59*	0.73*	0.63*	0.60*	0.74*	0.03	0.02	1			
Feedback and Support	0.54*	0.53*	0.68*	0.50*	0.52*	0.65*	0.01	0.03	0.79*	1		
Organisation & Management	0.61*	0.62*	0.68*	0.50*	0.52*	0.75*	0.21	0.15	0.73*	0.82*	1	
Overall Satisfaction	0.50*	0.54*	0.58*	0.44*	0.49*	0.62*	0.11	0.04	0.70*	0.74*	0.72*	1

Table 3: Correlation Matrix. All correlation coefficients with a * are significant at the p = 0.01 level.

4.3. Validity and Reliability of Measures

The next step in our analysis is to check the validity and reliability of the questionnaire and the variables constructed based on this questionnaire. Table 4 reports Cronbach's alpha as a measure of internal consistency and Loevinger's H coefficient as a measure of scalability (Gliem and Gliem, 2003). As can be seen, the values of alpha for all sub-scales are higher than 0.7 indicating higher consistency between the items and the scales consisting of these items. In addition the values of H coefficient are higher than 0.5 for all scales and sub-scales. These values of alpha and H indicate a high level of reliability in the questionnaire responses and increases our confidence that the questionnaire provides consistent measures of the variables constructed to test our research hypotheses.

Further, Figure 4 illustrates the convergence and divergence validity of the main scales. In particular, it shows the correlations between the items and the scores of the four main scales: simulation-based experiential learning, deep learning, surface learning, and student satisfaction. This helps to test whether the items are correlated enough with the dimension they theoretically belong to, and whether they are more correlated with their own dimension than with other dimensions. Overall, it is clear that all the correlations between the items and their dimension are significantly higher than the 0.4 threshold indicating high degree of convergence. It also appears that all items are more correlated with their own dimension than with other dimensions indicating high degree of divergence. This indicates a high level of validity in the variables constructed to test our research hypotheses. We also provide similar measures of convergence and divergence validity of the 12 sub-scales we use in our analysis. In particular, Figures 5-8 illustrate the convergence and divergence validity of the sub-scales of simulation-based experiential

	Items	Cronbach's alpha	Loevinger's H coefficient
Experiential Learning Stages	12	0.94	0.64
Concrete Experience	3	0.86	0.77
Reflective Observation	3	0.79	0.66
Abstract Conceptualization	3	0.84	0.72
Active Experimentation	3	0.85	0.72
Deep Approach to Learning	10	0.91	0.59
Deep Motivation	5	0.91	0.76
Deep Strategies	5	0.88	0.65
Surface Approach to Learning	10	0.96	0.78
Surface Motivation	5	0.95	0.83
Surface Strategies	5	0.92	0.79
Student Satisfaction	20	0.94	0.53
Teaching and Learning	8	0.88	0.53
Feedback and Support	4	0.83	0.64
Organisation and Management	3	0.78	0.59
Overall Satisfaction	5	0.85	0.64

Table 4: Validity and Reliability: Measures of internal consistency (alpha) and scalability (H) of the main measurement scales and their components. N = 57.

learning, deep learning, surface learning, and student satisfaction, respectively. Based on the correlations between the items and their sub-dimensions, we can confidently conclude that there is a high level of validity in the sub-variables constructed to test our research hypotheses.

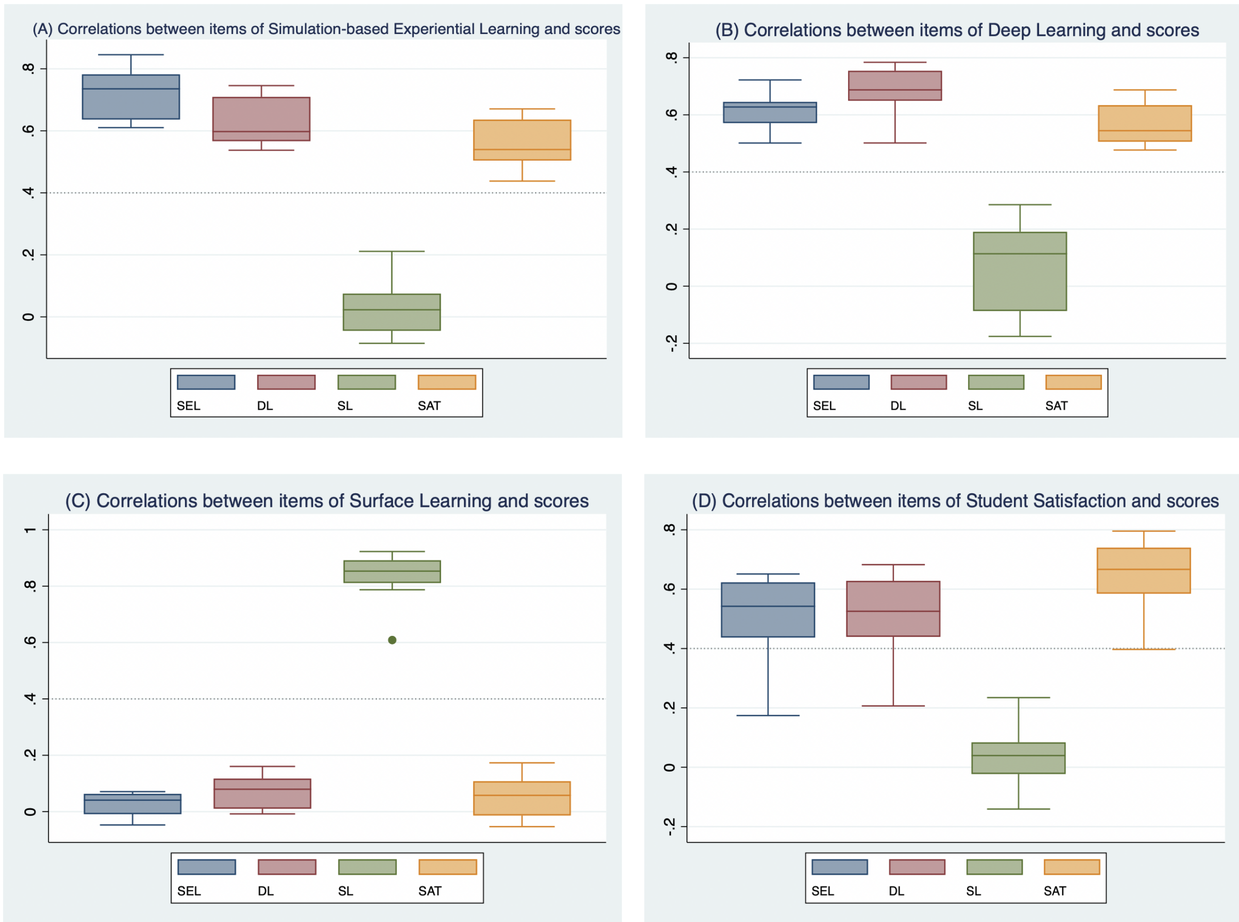

Figure 4: Convergence and Divergence: The correlations between the items and the scores of the four main scales: simulation-based experiential learning, deep learning, surface learning, and student satisfaction.

Figure 5: Convergence and Divergence: The correlations between the items and the scores of the subscales of simulation-based experiential learning.

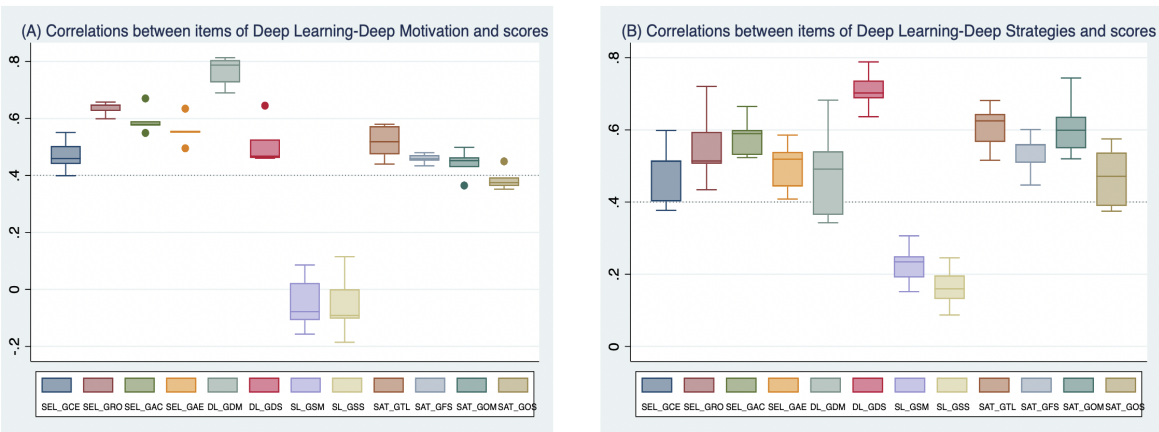

Figure 6: Convergence and Divergence: The correlations between the items and the scores of the subscales of deep learning.

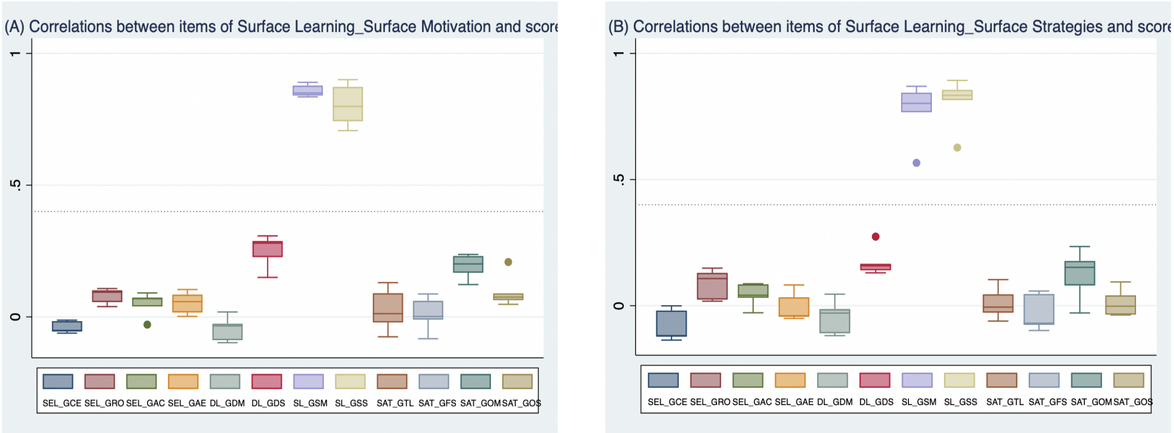

Figure 7: Convergence and Divergence: The correlations between the items and the scores of the sub-scales of surface learning.

Figure 8: Convergence and Divergence: The correlations between the items and the scores of the sub-scales of student satisfaction

4.4. *Confirmatory Factor Analysis*

Following the tests of validity and reliability above, we run an initial confirmatory factor analysis to examine the degree to which the supposed structure of the questionnaire fits the data including the number of scales/sub-scales and the clustering of items (Brown and Moore, 2012). We first fit a five-factor confirmatory factor model to data to check the validity of the five main scales used in the analysis. Based on the cutoff criteria suggested by Hu and Bentler (1999), the results show an adequate fit for the model with a comparative fit index (CFI) of 0.99, a chi-square χ^2 minimum ratio of 0.001, and a root mean square error of approximation (RMSEA) of 0.001. We then fit a twelve-factor confirmatory factor model to data to check the validity of the twelve sub-scales used in the analysis. The results also show an adequate fit for the model with a CFI of 0.98, a χ^2 minimum ratio of 0.001, and a RMSEA of 0.002. Overall, the results show that the supposed structure fits the data adequately well indicating a high level of validity in the constructs used to test our research hypotheses.

4.5. *Main Results*

We use structural equation modeling to test our research hypotheses as shown by the conceptual model in Figure 2. The model's parameters were estimated using the maximum likelihood method. The adequacy of the model fit is assessed based on the criteria suggested by Schermelleh-Engel et al. (2003) who recommend that a ratio of chi-square to degrees of freedom (χ^2/df) between 0 and 2, comparative fit index (CFI) above 0.97, and a standardized root mean squared residuals (SRMSR) less than 0.05 indicate a good fit of the model to data.The estimated model is shown in Figure 9. All the parameters are standardised. The significance of all coefficient estimates displayed on the model solution is measured at the p = 0.05 level. The estimated goodness of fit indices are $(\chi^2/df) =$ 1.86, CFI = 0.987, and SRMSR = 0.043. This indicates that the supposed model fits the adequately well. Also, R^2 for the Student Satisfaction as a function of deep and surface approaches to learning and simulation-based experiential learning is 0.83 indicating that a significant percent of the variance in student satisfaction is being explained by the changes in the independent variables.

The coefficient of the path between the deep approach to learning and student satisfaction is 0.85 indicating that students who find the simulation-based experiential learning

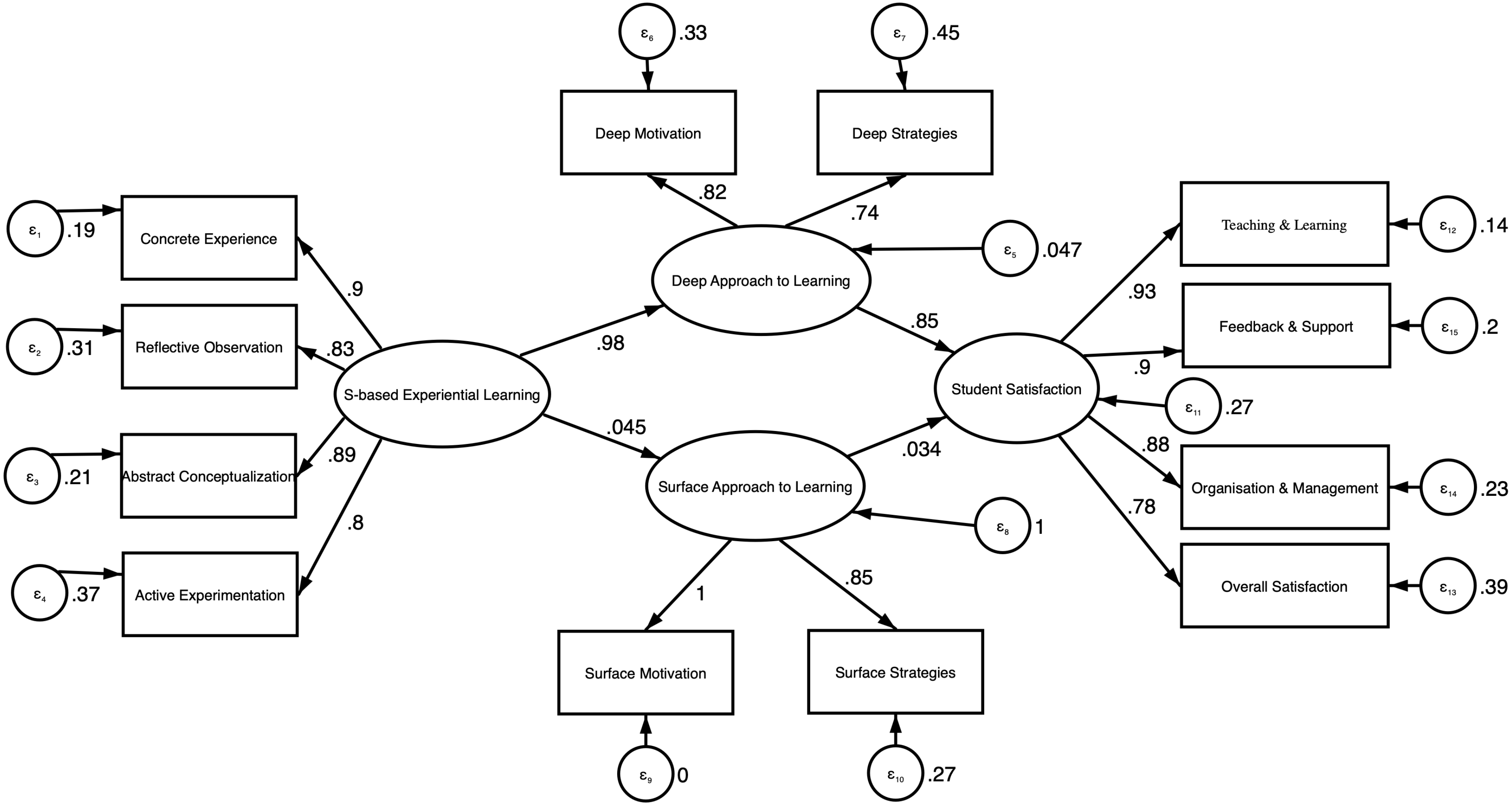

Figure 9: Estimated Structural Equation Model (SEM) of the effect of simulation-based experiential learning on student satisfaction. All coefficients are standardised. N = 57. Significance is based on p=0.05.

activities intrinsically motivating and rely on deeper learning strategies appear to have a more positive learning experience and are more satisfied. This supports Hypothesis 1a. Furthermore, the coefficient of the path between the surface approach to learning and student satisfaction is 0.034 and is not significant. This indicates that students who complete the simulation-based experiential learning activities only with surface motivation and rely on memorization or other low level surface learning strategies are less satisfied and have a relatively negative learning experience. This supports Hypothesis 1b.

In addition, the high and significant coefficients on the four stages of simulation-based experiential learning indicate a greater completion of all four learning stages. We expect this to lead to higher student satisfaction. The coefficient of the path between the simulation-based experiential learning and the deep approach to learning is 0.98 suggests that experiential learning activities that incorporate the four stages of the experiential learning cycle stimulate intrinsic motivation and encourage students to use deep learning strategies and higher cognitive skills. This leads to higher student satisfaction and provides support to Hypothesis 2a. On the other hand, the coefficient of the path between the simulation-based experiential learning and the surface approach to learning is 0.045 and is not significant which supports Hypothesis 2b. This also indicates that if the experiential learning activity is not designed well, it can motivate students to do the minimum requirements to accomplish a task. Students could then be less satisfied about learning and teaching which negatively affects the overall student satisfaction. Overall, these findings are consistent with the findings of Bacon and Stewart (2006) on the importance of the project design in the experiential learning process to enhance student learning and to also ensure that the experience is educative.

Finally, we follow the method suggested by Baron and Kenny (1986) to test Hypothesis 3 which states that the effect of the simulation-based experiential learning activities on student satisfaction is mediated by the student approach to learning. According to Baron and Kenny (1986), three conditions need to be met to establish a mediated effect: there should be a significant relationship between the independent variable (simulation-based experiential learning) and the mediators (deep and surface approaches), there should be a significant relationship between the mediators (deep and surface approaches) and the dependent variable (student satisfaction), and there should not be a significant relationship between the independent variable (simulation-based experiential learning) and the dependent variable (student satisfaction). Two of these three conditions are met as shown by the significant coefficients displayed in Figure 9. To test the third condition, we estimate another version of the model in Figure 9 after adding a direct path between (simulation-based experiential learning and student satisfaction. The results show that the direct path is insignificant with a coefficient of 0.09 and p = 0.17. Therefore, these results support Hypothesis 3 that the effect of the simulation-based experiential learning activities on student satisfaction is mediated by the student approach to learning.

4.6. Discussion

This study provides empirical evidence on the effect of simulation-based experiential learning activities on student satisfaction. The study provides three main findings. First, students with higher perceived satisfaction are mostly intrinsically motivated and use deep learning strategies. Second, surface approaches to learning including surface motivation and surface strategies, where students seek to complete a task for the sake of meeting some requirements and as a result fall short of utilising higher cognitive skills, fail to enhance student satisfaction. These findings are consistent with the results of Young et al. (2008) who evaluate experiential learning activities with a focus on students' perceived learning and Zhai et al. (2017) which show that student satisfaction is positively associated with perceived quality and perceived value of learning. Third, simulation-based experiential learning activities can enhance student experience and satisfaction. This is also consistent with previous studies that report a positive impact of experiential learning on student satisfaction (e.g. Daly, 2001; Zhai et al., 2017). In particular, the students feel they learn more and in a more effective way. They also believe that the concrete experience they are involved in would enhance their employability. Students also feel they are part of a learning community where they interact with each other and the faculty which contributes to improving their satisfaction.

The findings of this study also show evidence to support the effectiveness of simulation-based experiential learning and its appropriateness for student assessment. Nevertheless, the effectiveness of this method depends on its impact on the students' approach to learning. The success of this method will highly depend on the degree to which it stimulates deep motivation and learning strategies. Our findings here are in line the previous findings of Bacon and Stewart (2006) on the importance of "developing a pedagogy that requires deep learning early and often". Understanding the effect of the simulation-based experiential learning on the learning process is key to understanding why many high performing students might not be fully satisfied with the learning process. This suggests that simulation-based experiential learning activities should be carefully designed and assessed to make sure that the expected outcomes are achieved. Therefore, it is clear that designing simulation-based experiential learning activities that explicitly incorporate all the four stages of the learning cycle (Kolb, 1984), and creating experiences that intrinsically motivate students (Young et al., 2008), is vital to stimulate students to utilise deep learning strategies that relies on high cognitive skills and meaningful learning that could ultimately improve student satisfaction.

5. Conclusion

This study shows that simulation-based experiential learning activities can provide students with a hands-on experience of the real-world practice of finance. This helps students to engage in the learning process and become active learners who utilize deep learning strategies. Consequently, as shown by the results of this study, learners become more satisfied with their learning experience. These findings are consistent with those of Farashahi and Tajeddin (2018) on the effectiveness of simulations in finance education. Our findings are also consistent with previous findings on the impact of simulation-based experiential learning on student motivation and engagement (Jankowski and Shank, 2010; Weiser and Schug, 1992), students' perceived learning (Wolmarans, 2005), and student satisfaction (King and Jennings, 2004). Our findings contribute to the financial education literature by providing an example of suing a simulation-based experiential learning activity to improve overall student experience and in particular student satisfaction. Nevertheless, a main limitation of this study is that it uses data collected from postgraduate students from one university. The learning experience of those students may differ from the learning experience of other finance students enrolled at other universities. Future research might be needed to evaluate the effect of implementing simulation-based experiential learning using data from different universities.

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