

Business simulations in financial management courses: Implications for higher education

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Abstract

Business simulations provide a teaching method that typically yields (1) more hands-on experience, (2) a higher level of excitement, (3) a higher noise level (and yet a lower incidence of problems), and (4) more commitment than traditional methods of teaching (McLure 1997, 3). Business simulations are experiential learning opportunities that have been successfully used for higher education in a wide range of disciplines. They are also ideally suited for use in adult education, where the focus is more on facilitating learning than traditional methods of knowledge transfer are. This article reports on a study that examines the value added by business simulations in a financial management course, as perceived by the learners. The reasons why learners experience this teaching method as positive are investigated. It would seem that higher education in financial management has much to gain from a wider application of business simulations.

INTRODUCTION

The recent rapid growth of computer technology has had the effect that computer-based business simulations have been hailed as perhaps the biggest contribution to higher education of this technology. This innovative approach may be a solution to the educational question of what the best method is to facilitate the process of adult education in financial management. If it is indeed true that business simulations add value for adult learners, this could have important implications for future higher education in financial management.

THE AIM OF THIS STUDY

This article seeks to determine the impact of the use of business simulations on higher education in financial management. Do learners 1) regard a business simulation as a positive learning experience; 2) achieve a better understanding and integration of concepts; 3) enjoy the learning process more when a business simulation is used; and 4) think that the business simulation should be used in future financial management education? What are the most important benefits that

learners experience when they participate in a simulation? What are the possible drawbacks? Answers to these questions may have several implications for future financial management education.

THE RESEARCH APPROACH

This article reviews the results of a study that was conducted to investigate the impact of using a business simulation in the financial education of adult learners. A whole enterprise, medium complex business simulation was used in an introductory course in finance for two groups of adult graduate learners. The first group of learners were studying for a Master's degree in Project Management (MPM). The second group of learners was studying for a Master's degree in Engineering Management (MEM).

NEW METHODS TO DISSEMINATE KNOWLEDGE IN HIGHER EDUCATION ARE NEEDED

Expanding knowledge and the increasing use of technology, together with a call for social reconstruction and development, have accelerated the need for higher educational institutions to reappraise their curricula and learning programmes (Ntshoe 2003, 61). New ways to disseminate knowledge and add value for learners should be explored. Outcomes-based education (OBE) entails, amongst other things, that teachers must strive to provide expanded learning opportunities for all learners in recognition of the fact that not all learners can learn the same things in the same way or in the same time (Spady 1994, 18). If learning is seen as a process of developing understanding by integrating new knowledge into the learner's world of sense and meaning (Killen and Hattingh 2004, 73), ways to disseminate knowledge that strive to integrate different areas and disciplines should be actively pursued in higher education.

Davies and Pillay (2000, 196) agree on the need to integrate the often immense theoretical knowledge that graduates are equipped with in higher education with practical problem-solving skills. Many lecturers in higher education are finding that teaching the way they were taught and using the traditional lecture format is no longer always appropriate (Quinn and Vorster 2004, 364). Research shows that, in order to create contexts favourable for the encouragement of life-long learning, learners need to be actively engaged in the learning process. In an educational environment in which global trends prompt educators to consider alternative approaches to teaching and learning, new ways should be found to educate more efficiently and effectively (De Wet and Van Niekerk 2001, 93).

EXPERIENTIAL LEARNING MAY BE THE ANSWER

Perhaps the biggest proponent of experiential learning was Kolb (1984, 38), who

suggested that learning progresses through a cycle, following definite steps (see Figure 1). These steps are: (1) concrete experience, (2) reflective observation, (3) abstract conceptualisation and (4) active experimentation.

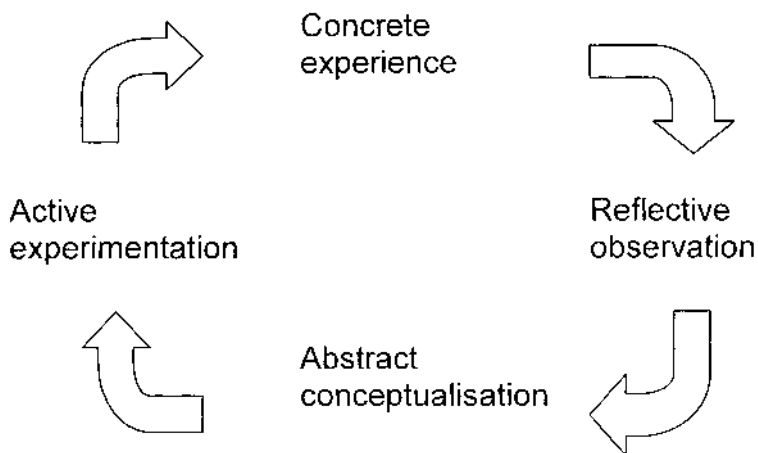


Figure 1: Kolb's (1984, 38) experiential learning cycle

After attending a lecture or looking at a case study, a learner may reflect on what he or she has been told or has observed. Conceptualisation requires the learner to ask: 'What can I learn from this that I can apply elsewhere?' In the experimentation phase, the learner then applies this knowledge under other circumstances, which leads to a new experience, and the cycle continues.

'Experiential learning' has been used to describe diverse educational practices, ranging from on-the-job training, to classroom-based simulations (Cherrington and Van Ments 1994, 16) and service learning, internships, practicals, and applied projects as well as less structured experiences – personal and professional – that learners can reflect upon and assess from a learning point of view (Washbourn 1996, 11). Gentry (1990, 20) defines experiential learning as 'participative, interactive and applied', or, to put it differently, as 'learning by doing'. Many possibilities arise from this, but most are based on the notion that learners are more active than passive in the learning process. Furthermore, the concept of using the experience which mature learners bring with them as suitable material in the learning process has always been a central tenet of adult continuing education (ACE) at universities (Kolb 1984). Experiential learning also has an important role to play in adult education because of its role in personal development and class-based learning, and the incorporation of this learning into the workplace (Lewis and Williams 1994, 5).

Various researchers have found experiential learning to be very suitable for higher education in general, and more specifically for adult education, because of its focus on higher cognitive levels. Usher (1999, 155) argues that experiential

learning in higher education contributes to more appropriate skills in the workplace. Yan (1999, 57) agrees that experiential learning is more successful than traditional learning when assisting tertiary education learners at mastering difficult concepts. Burns and Gentry (1998, 133) have found that experiential learning results in more motivated learners. Babbar (1994, 149) found an experiential exercise helpful in instilling a greater sensitivity for detail necessary for effective decision-making and managing in graduate learners. Mysliwiec (2005, 5) points out that teachers have an obligation to provide a supportive environment where learners can learn by making mistakes and correcting them.

BUSINESS SIMULATIONS AS A FORM OF EXPERIENTIAL LEARNING

A business simulation is perhaps the best example of an experiential learning opportunity which exposes learners to all four steps in the learning process, as identified by Kolb (1984, 38) (see Figure 1). In the first step, learners experience the excitement of managing a simulated company. In the second step they observe and reflect on the performance of their simulated company during each round of the simulation. In the third step they conceptualise and combine all the knowledge that they have previously gained from lectures and text books in group discussions on possible values for the input-variables to improve their company's performance during the next round of simulation. In the final step of Kolb's (1984) learning cycle learners experiment in trying to improve their company's performance, leading to a new experience and a new cycle.

At a higher level of learning, the experience of participating in the business simulation could be the first step. Then learners observe the process and the changing performance of their simulated companies. Through conceptualisation they could subsequently ask what principles they have learned that they can transfer to real life, and through active experimentation they could apply these principles.

Computer-based business simulations may prove to be one of the biggest contributions that the recent explosion in information technology has made to education (Thiagarajan 1998, 35; Gopinath and Sawyer 1999, 477). This type of simulation offers a number of advantages and satisfies many of the requirements of the South African Qualifications Authorities (SAQA) (Wolmarans 2000, 1). New technologies are constantly transforming the business simulation industry and adding new capabilities and qualities (Summers 2004, 208). When teachers and trainers use simulations, they harness these capabilities and qualities to assist in the learning experience. Computers are excellent at quantifying a large number of interactions between critical variables, as well as at providing feedback to learners rapidly. This rapid feedback often generates lively discussions in groups, allowing learners to learn from one another.

People learn more when they are enjoying themselves, which is not true only of children, but also of executives and managers (Elgood 1997, 5). Learning seems to

be more effective when it is combined with enjoyable activities (Rao 1995, 44). The material that is mastered in such a way is also remembered longer. After investigating a series of exploratory studies dealing with learning in total enterprise simulations, Gosen and Washbush (2004, 270) have concluded that this type of simulation offers considerable potential for learning in various disciplines.

Business simulations have been used successfully in general management (Nicholson 1997, 438; Smith 1996, 76; Wolfe and Rogé 1997, 423), economics (Herz and Merz 1998, 238), strategic management and business policy (Anderson and Lawton 1992b, 326; Walters, Coalter and Rasheed 1997, 170; Tompson and Dass 2000, 22), and marketing management (Hendrikz 1991, 13; Joannides and Oldenboom 1999, 38; Kenneth and Robert 2004, 169). In all these studies it was found that learners enjoyed participating. Even when a business simulation was used in the introductory week of an executive MBA course, participants became so committed to the simulation that they had to be actively encouraged to move away from simulation activities and back into lectures and case discussion sessions (Gooding and Keys 1990, 54).

Users of computer simulations rate them far more highly as effective teaching methods than either lectures or case studies (Faria 1998, 304). Learners also seem to prefer business simulations to other methods of knowledge transfer (Vaidyanathan and Rochford 1998, 144; Tompson and Dass 2000, 24). Introductory courses in managerial disciplines can be made more meaningful and more relevant through the use of business simulations (Montgomery and Brown 1997, 217). Business simulations are also a valid teaching tool and provide a meaningful experience for higher education learners of situations conforming to real-world business firm outcomes (Faria and Weffington 2005, 259). Simulations typically have four main advantages over more conventional media and methodologies such as books, lectures, or tutorials (Alessi and Trollip, 2001, 229). First, they tend to be more motivating. Second, they enhance transfer of learning. Third, they are usually more efficient. Finally, they are one of the most flexible methodologies, applicable to all the phases of instruction and adaptable to different philosophies. Learners are more motivated and learn more when they participate in a business simulation (Garris, Ahlers and Driskell 2002, 441).

EXPERIENTIAL LEARNING IS APPROPRIATE FOR ADULT LEARNERS

Experiential learning in adult education has been argued to be one of the most important contemporary areas of scholarship (Fenwick 2003, 123). Adult learners are active learners and willing to participate in the learning process (FERENCE and VOCKELL 1994, 25). They love hands-on learning opportunities and tend to focus on real-world situations. Their learning materials should offer more explicit opportunities to relate to what they experience in practice (GREYLING, GEYSER and FOURIE 2002, 120). These learners often bring a wealth of accumulated experience

with them into educational events, and therefore their learning orientation can be linked to problems, practical challenges or needs arising from their vocational and practical roles.

In order to be really meaningful in improving adult learners' performance, experiential learning needs to be rooted in the culture and values of the social environment in which the adults live (Ndoye 2003, 353). This is especially true when experiential learning is applied in developing countries. Experiential learning also helps to promote an ethos of life-long learning and develops in adult learners the capacity for life-long personal and professional development through self-learning and reflection (Hannon, McBride and Burns 2004, 95). Through multidisciplinary decision-making, experiential learning provides opportunities for the integration of theory with practice, while capitalising on the characteristics of adult learners (Herremans and Murch 2003, 63).

BUSINESS SIMULATION IN FINANCIAL MANAGEMENT EDUCATION

Computer-based simulations have been successfully used in financial education for a number of different reasons. Positive results have been obtained in general financial management (Rice and Haslem 1981, 91; Smith 1996, 76; Wolmarans 2005, 121), portfolio management (Burns and Burns 1982, 81; Elan and Sanderson 1991, 11), options trading (Singleton 1986, 79; Cooper and Grinder 1997, 95), investment management (Tessema 1989, 33; Angel 1994, 61; Brozik and Zapalska 2002, 242), risk/return trade-offs (Hogan and Kish 1999, 83), and asset management (Wenzler 2005, 75). Although not all of these studies entailed the use of business simulations *per se*, as a rule learners found that they learned much more because of the simulation than they would have learnt without it.

Strand, Lehmann and Hess (2001, 12) and Stainbank (2002, 151) report that the collaborative learning that occurs when learners study finance in groups offers significant benefits. Other benefits that occur when learners work in groups include improved attendance, increased student involvement in and preparation for class, and more efficient use of in-class time (Ingram and Adams 2003, 28).

Success is measured in financial terms in most computer-based business simulations, be it strategic management, marketing management or general management (Walters, Coalter and Rasheed 1997; Wolfe and Rogé 1997, Joannides and Oldenboom 1999). Examples of these are increased profitability, larger net assets, greater cash flows and higher share prices. Other examples are return on investment, return on equity and net asset value (Anderson and Lawton 1992a, 490). Indeed, in almost all business simulations, the term 'team performance' is usually used as a euphemism for cumulative profits over the time periods when the game was played.

It is therefore noteworthy that business simulations have not been used nearly as often in financial management education as in education in other disciplines. In a study to determine the extent to which simulations were used in various

disciplines, it was found that only 39% of the American Assembly of Collegiate Schools of Business (AACSB) member schools used simulations as part of their finance courses (Faria 1998, 299). This percentage was lower than the comparable figures for general management (45%), marketing (63%) and business policy (66%). This finding suggests that business simulations may clearly play a larger role in higher education in finance.

THE BUSINESS SIMULATION

The aim of using a business simulation in an introductory finance course would be to enable participants to experience first-hand what the implications of different decisions are for the profitability of a company. It is also important that participants acquire a holistic overview of the process of doing business, in order to realise that all processes have to be aligned with one another in an optimal system.

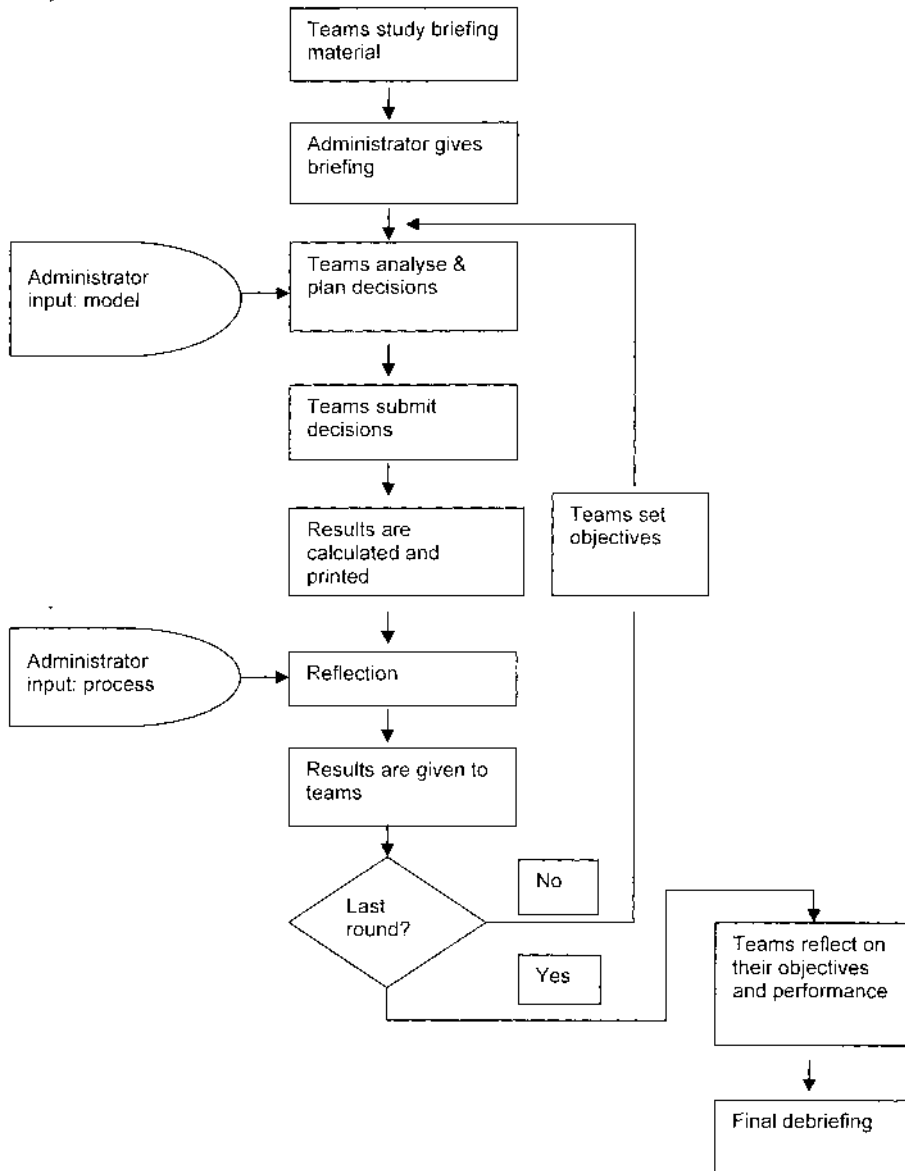
The simulation used in this study was PROSPEX (Macey 1997). This is a whole enterprise simulation of middling complexity. It simulates the flow of value through a manufacturing company. This simulation is suitable for enhancing the financial skills of adult learners. It ran on a laptop computer, with a printer attached, in order for the results of each round of decisions to be printed out.

The participants present formed teams consisting of six to eight people each. Each team managed a company competing with other companies in a market with two products. This structure where teams compete is called a 'tournament' and is highly effective when teaching business skills with a total enterprise simulation (Thavikulwat and Pillutla 2004, 5). Each team provided values for 11 variables per time period (representing two months of real time). The variables ranged from the amounts of raw materials, labour hours and bank loans required by the manufacturing company to the prices at which two manufactured products were sold, the amount spent on advertising and a consultant's reports on the current competitive situation. Three pages of output per period included details on the income statement and the balance sheet. Each team aimed to have the most profitable company by the end of the simulation.

THE PROCEDURE

The procedure followed was suggested by Fripp (1993, 101) and it is set out in Figure 2.

The learners were given a short introduction to the simulation, with an explanation of all the variables, their relationships and the way they interact financially. They also each received a copy of the participants' manual (only five pages long) to refer to whenever necessary. This way of introducing a simulation is very effective under time pressure (Snow, Gehlen and Green 2002, 526). Each team represented the 'board of directors' of their respective company. Regular 'board meetings' were held to decide on the values for the input-variables. The



Source: Adapted from Fripp (1993, 101)

Figure 2: The structure of a typical computer-based business simulation

business simulation was integrated with the course in finance, in the sense that frequent reference was made to where participants could, for instance, find the elements of the income statement on the computer printout for their companies. Financial concepts such as analysing statements or the difference between fixed and variable costs were also explained with reference to the simulated companies.

The participants were often requested to use parts of their teatimes and lunchtimes to complete the input forms, in line with Nicholson's (1997, 438) contention that good business simulations should put participants under at least some time pressure, similar to real decision-making.

After the simulation had ended and the winning team had been congratulated, the participants were requested to provide written feedback on how they had experienced the simulation. Petranek (2000, 108) argues that learners learn more from a written debriefing than from a purely oral debriefing. Debriefing is an important part of the learning process, because it allows learners to make a connection between the experience they have gained from the simulation and experiences in real-life situations (Peters and Vissers 2004, 70).

The learners were requested to rate the learning they had experienced during the simulation game on a Likert-type scale of 1 ('very little') to 10 ('quite a lot'). They also had to rate their learning experience during the average lecture, as well as the average case study they had encountered up to that point. The learners were then requested to list the three main benefits that they had experienced in the simulation. They were asked to respond to the following questions: Did the simulation help them to gain a better understanding and integration of concepts? Did they enjoy the learning process more because of the simulation? Should it be used in future? The learners could also comment on their experience of the simulation, including any possible drawbacks.

The results were analysed using the SAS (Statistical Analysis Systems) on the mainframe of the University of Pretoria. A Waller-Duncan k-ratio t-test was performed in the PROC GLM procedure (SAS Institute 1985, 487) to determine whether the respondents rated the simulation, lectures and cases in a similar manner or not. Means with the same letter under 'Grouping' in the output to this procedure are not significantly different, which could assist the researcher in deciding whether the participants had rated the simulation significantly higher than either cases or lectures (see Table 1).

THE EMPIRICAL STUDY

The sample

The business simulation was used during two 20-hour, two-and-a-half day courses in finance for learners studying for a Master's degree in Project Management (MPM) (29 learners) and for learners studying for a Master's degree in Engineering Management (31 learners). Financial management is a compulsory module in both of these programmes. All these learners had at least a four-year degree in Engineering (B.Eng.) or a three-year degree in Science (B.Sc). Because there is no reason to believe that the two groups differed in respect of their experience of financial management, they are treated as one group. None of them had had previous academic exposure to finance. Their median age was 31 years, with a range from 25 to 45 years. Of the 60 learners, only six indicated that they

had had previous exposure to simulations, all in an operational (production) environment. All the learners indicated that they had had exposure to lectures and case studies in previous studies, and it was therefore assumed that they were able to compare their experience of the business simulation with these two types of learning opportunities.

The results

The rating of learning opportunities by the MPM and MEM learners is set out in Table 1. The amount of learning that the learners experienced during the simulation was rated on a scale of 1 to 10, with 10 representing the most learning experienced. The average lecture and average case study were rated on a similar scale for the purposes of comparison. Groupings with the same letter are not significantly different.

Table 1: Rating of learning opportunities by MPM and MEM learners (n=60)

Learning opportunity	Average	Std. dev.	Grouping
Business simulation	8.58	1.55	A
Average lecture	7.21	1.45	B
Average case study	6.95	1.60	B

From Table 1, it is clear that these learners experienced significantly more learning during the simulation game than during both the average case study and average lecture to which they had had prior exposure. They were also requested to rate, on a 10-point scale (1 = 'least/no', 10 = 'most/yes'), their reactions/answers to the statements set out in Table 2.

Table 2: Average responses of the MPM and MEM learners (n=60)

Learning opportunity	Average response	Std. dev.	Significance
The simulation helped me to gain a better understanding and integration of concepts	8.25	1.26	$p < 0.01$
I enjoy the learning process more because of the simulation	8.15	1.30	$p < 0.01$
The simulation should be used in future	8.92	1.33	$p < 0.01$

All of these average ratings differ significantly from 5.5 ($p < 0.01$), which was the mid-range of possible ratings. The results confirm that the simulation game helped them to a better understanding and integration of concepts, and they enjoyed the learning process more because of the simulation. These learners were of the opinion that this type of experiential learning should definitely be used again in future.

The learners were requested to provide and rank the three most important benefits that they had experienced during the business simulation. The results of the answers to this open-ended question are summarised in Table 3, where only the five most important benefits are listed.

Table 3: The ranking of simulation benefits by the MPM and MEM learners (n=60)

Benefit	1st	2nd	3rd	Total	%
1. A holistic financial view of a company	20	14	3	37	62
2. Teamwork and learning in groups	15	13	6	34	57
3. Improved decision-making	8	7	5	20	33
4. Thinking in terms of profitability	7	7	6	20	33
5. Understanding financial statements	6	6	5	17	28

From Table 3 it is clear that experiencing the simulation helped these learners obtain a better holistic financial overview of a company. Teamwork and learning in groups helped to achieve better decision-making. The exercise helped them to think in terms of profitability and understand financial statements better.

The comments were generally favourable, while only a few learners experienced drawbacks. Some learners noted that it took a while before the group dynamics were sorted out, while others thought that the time allocated for the simulation was too short.

SUMMARY AND CONCLUSION

For real learning to occur learners need to transform knowledge; they need to engage with it in an active way in order for it to be meaningful to them; to construct new concepts or ideas for themselves and take personal responsibility for their learning (Quinn and Vorster 2004, 368). Business simulations may be the 'golden key' to assist with such a process in financial management education.

In the introduction to this article, the question was posed whether learners in financial management regard a business simulation as a positive learning experience. The results shown in Table 1 confirm that the learners in this study experienced a business simulation as a significantly more positive learning experience than either an average lecture or an average case study discussion.

A second question was whether simulations aid learners to gain a better understanding and integration of concepts, and a third question was whether learners enjoyed the learning process more because of the simulation. From Table 2 it is evident that learners felt significantly positive on these issues. These learners also agreed that the business simulation should be used again in future financial management courses.

From Table 3 it seems that the most important benefits that these learners experienced when they participated in the business simulation were a better holistic

financial view of a company, teamwork and learning in groups, better decision-making, learning to think in terms of profitability, and understanding financial statements. Some learners found the time allocated to the simulation too short, while others found that they first had to sort out the dynamics in some groups before they could take effective decisions.

The conclusion can be drawn that these adult learners experienced their participation in the business simulation as significantly positive. It seems that total enterprise business simulations have a definite role to play in financial management education. Finance lecturers could take this into account when planning future value-adding opportunities.

AREAS FOR FURTHER STUDY

How widely are business simulations used in South African management education in general, and, more specifically, in financial education? What are the main obstacles that finance educators experience when they use simulations and how can these obstacles be overcome? How can business simulations be used on a wider scale to enhance learners' understanding of financial concepts while still creating a favourable learning experience? Could the use of business simulations in disciplines other than financial management also lead to the same excitement and value-adding that was experienced in this study? Lastly, if simulations are eventually used in most subjects, will learners reach a saturation point where the method becomes less effective? Further research may focus on finding answers to some of these questions. Higher education in management in general and more specifically financial management may have much to gain from a wider application of business simulations.

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