

THE USE OF SIMULATION IN TRANSFERRING BUSINESS MANAGEMENT SKILLS: AN EMPIRICAL STUDY

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Abstract

This study reports on the use of simulation as approach to management education. After reporting the literature, the change in skills levels of participants in an entrepreneurship and business management simulation is empirically reported. Data from respondents were studied to compare if strategic, financial, operational, marketing and sales, human resource and integration skills changed after attending the simulation training. The findings revealed significant increases in the skills level of the participants after attending the workshop. High interrelatedness between the constructs was found and confirms the complex nature of operating a business and the learning required to be successful when doing so. Informal learning aspects associated with the simulation are also reported.

INTRODUCTION

In the past two decades, entrepreneurship has taken centre stage as a factor to enhance economic well-being in most countries. Fattal (2003:14) maintains that entrepreneurship has become a very valued element of a country's economic fabric. He states that "it has been recognised for its worth by individuals who have taken this route, through necessity or choice, and various government programs and venture capital initiatives that has sprouted to support innovative entrepreneurial projects".

One needs to determine what exactly this entrepreneurship "phenomenon" is about. Nieuwenhuizen in Nieman, Hough and Nieuwenhuizen (2003:9) is of the opinion that entrepreneurship entails the "recognising" of an opportunity, gathering resources to develop the opportunity, creating and growing a new venture, taking risks and eventually being rewarded with profit if the venture succeeds.

The challenge in enhancing entrepreneurial activity is one that South Africa is obliged to face. The common opinion surrounding entrepreneurship is that it can be utilised as a vehicle for economic well-being by reducing poverty levels and unemployment. Venter, van Eeden and King (2004:12) is however of the opinion that "eighty percent of all new small businesses fail in their first five years" and it has "been proven, time and again, that the main cause of business failure is the incompetent management of a business". Findings from a research study commissioned by Ernst & Young and Rand Merchant Bank support this by indicating that:

“Limited start-up capital, an inappropriate education system, outdated government regulations and bureaucracy are just some of the hurdles that inhibit entrepreneurial behaviour in South Africa” (Ernst & Young, 2004:2).

With entrepreneurship being seen as the cure for a lot of critical problems, the focus seems to not be directed towards creating new businesses. It is worrying to see that South Africa ranked last out of the 35 GEM countries sampled in 2005 on its “Established firm rates” (von Broembsen, Wood and Herrington, 2005:22). Foxcroft (2002:3) and De Faoite *et al* (2004:440) acknowledge that the course of using education as a means to improve the entrepreneurial base of African societies is a long route towards economic benefit. He claims however, that since research indicates that educational attainment is a significant variable in being entrepreneurial, “this method is considered the most beneficial for developing entrepreneurs and creating sustainable small enterprises in the long term”.

The White Paper on National Strategy for the Development and Promotion of Small Business in South Africa (1995:14) emphasises the importance of training in stating as one of their objectives: “The acquisition of relevant vocational, technical and business skills as being generally regarded as one of the critical factors for success in small businesses”. Taking this into account, it is clear that a heightened skills level in terms of business start-up and management is needed in South Africa. Based on this, it is necessary to evaluate tools that are currently utilized to develop these business skills.

This study thus aims to investigate the contribution that ComSim, a business simulator used in training, makes toward the increase of the participants’ skills level. Certain critical aspects of successful simulation training are investigated, where after ComSim as a business management training tool is evaluated.

In order to attempt this, a questionnaire was designed and distributed to ComSim participants. They then had to rate their skills levels before the ComSim workshop commenced and then again afterwards. It will be determined if the workshop had in fact enhanced the skills level of the participants.

LITERATURE REVIEW

Although small businesses fail due to a variety of reasons, a problem that is often cited as a major contributor to failure is managerial incompetence and lack of business skills. More than 90 percent of entrepreneurial failure is attributed to lack of abilities to perform managerial functions. Wright supports this as cited by Venter *et al* (2004:10) when he concurs that poor management ranks among the main reasons for the failure of many small businesses. It is therefore apparent that small business owners require certain managerial competencies in order to succeed. “This will allow small business owners to better manage their businesses and solve problems, resulting in improved chances for success and the ability to be a better contributor to the economy” (Venter *et al*, 2004:10).

In this paper business training is considered as the structured formal conveyance of business management competencies, which in turn refer to the concepts, skills and mental awareness used by individuals during the process of starting and developing their growth-oriented businesses. The basic aim of an educator should be to teach the student skills he/she can take back and apply to his/her workplace, thus gaining skills rather than knowledge (Doyle & Brown, 2000:330).

Education has been identified as a critical factor in preventing future high levels of long-term unemployment, and there is evidence of a strong correlation between the educational level achieved and high income over a lifetime. Training is now seen as a key part of the human resource management process, where workers are viewed as a source of wealth creation, rather than a cost to the company. De Faoite (2003:20) notes that skills and knowledge, as developed through training and education, are one of the few areas where a country can engineer a competitive advantage.

In further support of this, Timmons and Spinelli (2004:56) developed “The Timmons Model of the Entrepreneurial Process”. According to the model, the entrepreneurial process is dynamic and its fundamental components are the opportunity, the team, and the resources, with the founder taking charge of the success equation. Since opportunity, team and resources rarely match, the entrepreneurial process can be appreciated as a constant balancing act, requiring continual assessment, revised strategies and tactics, and an experimental approach (fit and balance). One of the most important resources in today’s knowledge driven age are business management skills. It is imperative for business owners and entrepreneurs to equip themselves with the necessary skills in order to successfully manage and renew their businesses.

There are several different methods that are used to train people in the necessary business skills. Most of these focus on theoretical knowledge, leaving out the practical implications it may have on a business. Lankard as cited by Swenson (2001:579) claims that the traditional position learners took up as “passive recipients” of knowledge belongs to the past. Learners need to actively participate in the learning process. Business simulations pose an alternative approach to training, where practical skills are attained and practised, while still based on a theoretical background.

Business simulations as a vehicle for experiential learning

Traditional training methods focus on gathering fact to utilize when the correct situation present itself. Real-world training is avoided because of the difficulty surrounding the amount of “noise” interruption and the actual time it takes a real world situation to play out. Aldrich (2006:49) is of the opinion that a student, when immersed in a situation of which he/she has little or no knowledge, a need to fill this gap will exist. Simulations are seen as excellent tools in identifying and filling this gap. Normally a simulation aims to fill the gap with practical knowledge, which will manifest as a skill. In contrast with a cold-learned fact, a skill, like riding a bike, is not easily forgotten, and when immersed in a similar situation, the student will apply it appropriately. Jiwa, Lavelle and Rose (2004:588) are also of the opinion that, in the real world,

one of the most efficient ways of acquiring knowledge and skills is to be “immersed within a situational context”.

Simulations are constructed situations that simulate the problems, constraints and resources of the everyday environment and place the learner in the midst of the maze, challenging them to find a way to the designated final objective. The generally accepted definition of simulation given by Guetzkow as cited by Jiwa *et al* (2004:589) is: “An operating representation of central features of reality”. Thus, to qualify as a simulation an exercise must have two essential features, namely it must represent a real situation of some sort and must be ongoing, i.e. dynamic.

Simulation exercises are useful in the sense that they are a mechanism for developing technical, professional and managerial skills. Simulation exercises can be used to improve an individual’s decision-making skills base and can also be used to improve group decision-making. Furthermore, simulation exercises can be used to make individuals aware of the need to be sensitive to others and to develop the necessary interpersonal skills that will allow decision making to be viewed as transparent and fair (Trim, 2003:399).

Building on that, Trim (2003:401-402) also reports that simulation exercises possess a number of other advantages:

- They have motivational qualities
- Facilitate team working
- Offer a risk-free environment
- Can complement formal lectures and case studies therefore they add variety; and
- Facilitate experiential learning by providing feedback.

David (2003:36) furthermore views simulation exercise as an all-encompassing tool that brings together theory and the internal and external environment in which a business function.

COMSIM business simulation explored

ComSim is a business management programme that utilises a computer aided simulation process together with lecture room discussions and role-plays to stimulate a competitive business environment, in which different teams compete against each other. The team’s focus is to take decisions and anticipate competitor strategies in addition to developing and implementing their own team strategy. The simulation runs over several quarters, and decisions need to be made and implemented in every quarter. The analysis of the decisions results in a comprehensive set of reports (income statements, cash flow statement, balance sheet, inventory report, production report, sales report and a balanced score card) for each company, on which the participants can build their revised strategies every quarter.

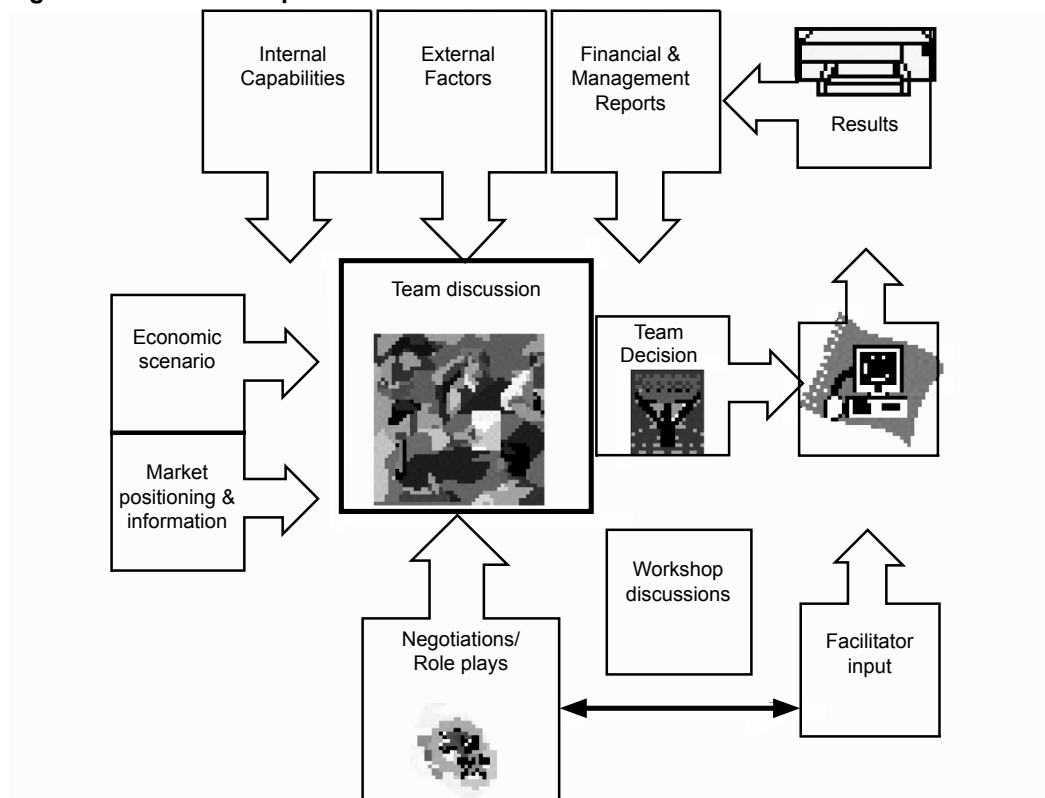
The ComSim process (see Figure 1) follows a well researched, but also logical flow in the decision-making process of managing a business. This not only resembles real-life situations,

but also allows for participants to draw on their own personal experience as well as learning interventions taken earlier. Participants work in small groups reflecting a management team as well as interaction with facilitators through role-plays (Mostert, 2005: 4). Negotiation with different facilitators (bank, suppliers, union, agents, representatives, dealers, service providers and more) is core to the process. The main aim of ComSim is to transfer business management skills, which specifically include:

- Strategic management skills
- Operational management skills
- Financial management skills
- Sales and marketing management skills
- Human resource management skills
- An integrated management skills approach

In training, the concept of the interrelationship between business functions is difficult to convey. It is an agreed-upon fact that learners with an integrated knowledge of the business functions will be able to add more value to their employers. The need exists for programs that combine theory, simulation and role-playing that will ease the difficulty of learning this integrated approach. (Stephen, Parente & Brown, 2002:164).

Figure 1. The ComSim process



Source: Mostert (2005:6)

The ComSim workshop is experiential in nature. Participants are not only exposed to various business challenges; but they have to find ways to deal with them through experience and supported fundamental business theory. This simulation environment assists them in making sense of the business environment that they have to operate in and to help with immediate implementation and application of the principles in a practical way. This immediate feedback is enhanced by facilitator coaching as well as inputs from other participants (Mostert, 2005:5).

An added advantage of ComSim is that the focus is also on teaching business students the skills to use basic computer programs such as Excel. According to Hwang (2001:66) in his article on *Modern simulation course for business students*, business decisions are increasingly getting more complex and often the only way to make a quick decision in the dynamic business environment is to simulate it.

PURPOSE OF THE STUDY

The importance of this paper lies in two intertwined components. These are as follows:

- According to Venter, van Eeden and King (2004:12): “Eighty percent of all new small businesses fail in their first five years” and it “has been proven, time and again, that the main cause of business failure is the incompetent management of a business”. Training is seen as an effective way of stimulating entrepreneurial activity in a country and in reducing small business failure (De Faoite *et al*, 2004:440).
- Tools being utilised for business management training need to be evaluated in terms of the effect (if any) on the skills level of the participants (De Faoite *et al*, 2004:440).

PROBLEM INVESTIGATED

The main goal of this paper is to identify and measure whether ComSim business skills training improved the skills level of the participants during the intervention.

RESEARCH OBJECTIVES

The following objectives have been formulated for the purpose of this study:

- The primary objective of this study was to analyse the learning experiences of the participants in terms of skills developed and used through the simulation.
- The secondary objective was to determine specific skills that were improved through the intervention.

HYPOTHESIS

Ho: No skills development took place by participating in the ComSim simulator.

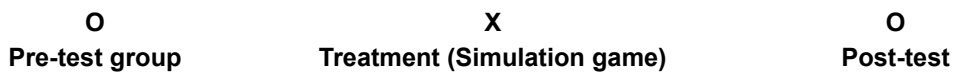
Ha: A skills development did take place by participating in the ComSim simulator.

RESEARCH METHODOLOGY

Research design

According to Cooper & Schindler (2003:146-150) the degree to which the research question has been crystallized indicates that this is a formal study as it begins with a research question and involves precise procedures and data source specifications with the goal being to test the hypothesis.

The design is a one group pre-test-post-test design, visually represented as follows:



The research environment and application of the case study was done in the actual training environment. It is a descriptive study with the aim to determine what the difference between the skill levels of the participant was before and is after participation in the simulation.

The time dimension is cross-sectional as the study was carried out once and represents a snapshot of what is happening at one point in time. The researchers' control over the variables reveals to be an *ex post facto design*, as the researcher has no control over the variables meaning that there is no possible way to manipulate the variables. It is only possible to report what is happening and what has happened.

The hypothesis is thus tested quantitatively. Measurement reliability and high construct validity is present due to proper questionnaire construction and proper controls implemented. Possible sources of error were minimised through optimal control of interpretation error, language effects and data capturing errors (Mouton, 2001:153).

Random personal interviews were conducted with to verify the findings and explore underlying aspects of the changes.

Measurement Instrument

Questionnaire design

For this study it was decided to develop a questionnaire with a structured rating scale, which would be completed by the respondents after completion of the course. The questionnaire contained 31 questions covering the different constructs as described. Table one shows the distribution of the questions over the different constructs.

Rating scale

A standard four point Likert scale (Cooper & Schindler, 2001:240) was used in which 4 is "agree strongly" and 1 is "disagree strongly". Participants had to rate their knowledge, understanding and insights into how to start and manage a business venture (based on the ques-

tionnaire statements) for pre and post intervention instances.

Response rate

The number of questionnaires handed out was 93 (n=93), and a 100% response rate was obtained.

The purpose of the questionnaire was firstly to determine how the participants perceive their pre intervention skills level. Then, the ComSim simulation was the intervention where after participants rated their skills level (post intervention). The questionnaire was designed to measure the five key areas of business management and their integration, which includes:

- Strategic
- Operational
- Financial
- Sales and Marketing
- Human Resources
- Integration

Sampling Design

90

In this study, a subjective approach by means of non-probability sampling was followed, as it satisfactorily met the sampling objectives. This method of non-probability is unrestricted. Thus a convenience method was used as the researcher had the freedom to choose all attendants of the ComSim workshop to complete the questionnaire. After completion of the simulation attendants were asked to evaluate their own knowledge, comprehension and insights before and after attending the course.

Data Collection

The data collection was done by means of administering the questionnaire and collecting the subject's responses. This method of data collection is empirical of nature. The population was either participants in the interventions offered by a university to the participants on behalf of the Industrial Development Corporation (IDC) or individuals attending the interventions on their own accord or as part of in-house training for larger firms. Participants included existing loan holders, potential loan applicants and employees of the firms using IDC finance.

Ratio data (strongly disagree, disagree, not sure, agree, strongly agree) will be used upon the 31 statements or questions as revealed in the questionnaire.

During interviews, notes were made and patterns were sought. Outstanding aspects are reported.

Data processing, basic analysis and evaluation of results

The responses were gathered directly from the questionnaire using a Microsoft Excel spread-

sheet and imported into the SAS software package at the Department of Statistics at the University of Pretoria. Some basic calculations were made to check the reliability of the data.

Finally the data was imported into the statistical software program where the final analysis and cross-tabulations were made. For the purpose of this study, recorded data is represented in the form of descriptive statistics, with means and standard deviations. A Wilcoxon paired T-test was performed to determine whether any significant differences between the pre and post test results could be observed.

Limitations of the study

1. High correlations might be problematic but were expected due to the nature of the business environment where for example: sales turnover, profit and finance are functions of each other.
2. The study made use of self-evaluation. People tend to evaluate their own skills as higher than it is which could lead to self-evaluation bias. The benefit is that they could reflect on their own knowledge before the intervention, which makes the reported scores more valid.

FINDINGS

The aim of the study is to determine if ComSim had an impact on the skills level of the participants. Data gathered by means of questionnaires was analysed and the findings is explained in this section. The objective of this section is to state the findings, and not to draw any conclusions or interpretations. Descriptive data is indicated in tabular format, indicating differences and relationships between various variables within the sample.

Constructs Discussion (dependant variables)

The 31 questions were structured into six constructs that links to the primary management functions found in a business. Table 1 shows the outcome of the factor analysis.

Strategy

This construct pertains to the pattern of action and resources allocation, to achieve goals of the organisation (Nieman and Pretorius, 2004:107). It encompasses all the management functions, setting goals and objectives pertaining to the business's vision and mission.

An important focus of this construct, sometimes unnoticed by the participants, is the teamwork and interpersonal skills attained when attempting to determine the appropriate goals.

Operations

This refers to controlling the process of converting inputs to outputs (Longenecker et al. 2003: 495) and includes all logistical functions associated with raw material, production, warehousing and distribution.

Financial

This includes the management and use of information from financial statements to indicate the business' financial needs, sources of financing and give a projection of its revenues, costs and profits (Longenecker et al. 2003:206).

Human Resources

Of all the resources available human resources can be seen as the one that is the most difficult to manage. The purpose of this function is to foster organizational policies that enhance the contribution employees make to the effectiveness of the organisation (Scarpello and Ledvinka, 1987:4). Soft skills such as time management and communication as well as the physical planning of personnel counted towards this construct. Teamwork is highlighted during the feedback sessions.

Sales and Marketing

This construct seeks to address the business activities that links with identifying a target market, determine that market's potential, and prepare, communicate and deliver a bundle of satisfaction to that market (Longenecker et al. 2003:218). The simulation is designed in the way that it provides clues of new market needs through news reports and economic indicators. The participants need to identify the direct and indirect influences associated with the news reports and devise action plans to respond.

Integrated

Basic management activities are covered under this construct. An important advantage of a simulation in this regard is that the participants need to focus on the interconnectivity of a business and its elements. Cause-effect like supply-demand-price interactions are imperative. For this reason it is necessary to attain skills to re-evaluate previous strategic decisions and its consequences and thereafter act on new information and market changes.

The analysis of the data provided the following results

Table 1 shows Cronbach Alpha values above 0.70 suggesting high inter-correlation between the elements of constructs. It also shows the inter-correlations among the six constructs for the full ComSim data set. Interdependence among variables is a common characteristic of most multivariate techniques. It must be noted that correlation provides no evidence of cause and effect. In this case it is clear that there seems to be a strong correlation (above 0.5) between several of the constructs. This is to be expected, as all the management functions in a business should be linked in order to provide an interconnected business strategy. If not it could contribute to different management inefficiencies. Looking at the correlations between "integration" and all the other constructs it confirms the integrated nature of business operations. The low and insignificant correlation between finance and human resources is interesting but as it was based on the pre intervention score, it is probably symptomatic of the perceptions of management about the relevance of the human resource function in the overall mix that contribute to venture success.

TABLE 1: ITEM ANALYSIS (Pre-intervention score) AND CORRELATION MATRIX

Parameter	Measured constructs					
	Strategic	Operations	Financial	Sales/ Marketing	HR	Integration
No of items	5	5	6	5	5	5
Sample	93	93	93	93	93	93
Mean	2.40	2.37	2.26	2.45	2.63	2.49
Variance	0.34	0.35	0.56	0.34	0.36	0.35
Std. Dev	0.58	0.59	0.75	0.59	0.6	0.59
Skew	0.07	-0.26	0.21	-0.15	-0.29	-0.3
Kurtosis	-0.67	-0.58	-0.46	-0.16	-0.08	-0.34
Median	2.00	2.00	2.00	2.00	2.00	2.00
Cronbach Alpha	0.75	0.78	0.91	0.8	0.83	0.8

Scale inter correlations

	1	2	3	4	5	6
Strategic	1.000					
Operations	0.723	1.000				
Financial	0.472	0.488	1.000			
Sales	0.566	0.609	0.488	1.000		
HR	0.335	0.315	0.137	0.328	1.000	
Integration	0.663	0.663	0.493	0.729	0.571	1.000

Table 2: Comparison of the pre and post intervention factor scores

	Pre intervention		Post intervention		Difference	T-test	P value
	Mean	Std Dev	Mean	Std Dev			
Strategic	2.398	0.583	3.451	0.374	1.054	19.05	0.0000
Operational	2.366	0.592	3.467	0.383	1.101	20.30	0.0000
Financial	2.260	0.751	3.320	0.514	1.061	18.09	0.0000
Sales and Marketing	2.450	0.589	3.363	0.483	0.916	15.51	0.0000
Human Resources	2.634	0.605	3.372	0.482	0.738	14.44	0.0000
Integration	2.484	0.597	3.378	0.428	0.895	16.99	0.0000

From Table 2 it can be deduced that there are significant differences between the means of the pre-intervention and of the post-intervention scores for all the constructs. This difference can be seen as significantly higher for the post intervention scores. This high significance is based on the fact that the P-values are all smaller than 0.0000. When a P-value < 0.05, the difference is generally accepted as significant.

Support for improved skills obtained from the interviews

Respondents further reported the following key aspects (amongst others) based on their experiences during the simulation:

- The practical nature and simplicity of the simulation with its realistic results assisted them to gain many new insights.
- Participants felt emotionally involved in the venture and process and wanted strongly to succeed. They almost felt sad when the simulation ended. They sometimes took it so serious that they reported “sleepless nights” in anticipation of the next decision cycle.
- The immediacy of the results directly after submission of their decision sheets enhances the learning process as it allows reflection when the data is fresh.
- The pressure to which participants were exposed during the simulation created decision-making circumstances similar to their working conditions and resulted in incorrect decisions.
- The role plays were excellent and distinguishes this program from any others they have attended. They reported that the expert knowledge of the facilitators was the key contributor to the impact of the role plays.
- Respondents often reported that the simulation made them realise how little they knew at the start and how complex it is to start and manage a business venture.
- The role of teamwork, basic communication and general “soft” issues were practically experienced.
- Insights about marketing positioning and integration of strategy with functions were instrumental in changing their views on how ventures should be managed.
- Participants reported that they are going to do things differently when returning to their ventures as their newly acquired knowledge had direct application value.

CONCLUSIONS

Firstly the literature confirmed many benefits associated with simulation interventions when it comes to entrepreneurship and business management training. Secondly, it was established that business management skills is key to the success of a business and subsequently the success of business in general for a country. It was therefore deemed necessary to investigate the ComSim program in this regard. This was done in order to determine if it has the sought after impact it claims to have. Thirdly we conclude that based on the findings of this study, the primary data disproved the stated hypothesis. This paper thus *rejects* the H0 that stated:

Ho: No skill development took place by participating in the ComSim simulator.

It therefore *accepts* the stated alternative hypothesis that skills transfer took place by participating in the ComSim simulator. Participants improved their management skills in regard to strategy application, financial know-how, sales and marketing skills, operational efficiency human resource aspects and integration of these management skills to successfully operate a business venture..

The interviews gave insights mainly into how the learning process was enhanced and the outstanding elements of the program. The in-depth involvement of participants in the learning process elevated their learning to a highlight in their study experiences. One outstanding as-

pect was that almost all participants reported that they are going to do things differently when returning to their ventures as their newly acquired knowledge had direct application value. When behaviour is changed it implies that learning has taken place successfully.

MANAGEMENT IMPLICATIONS

Lack of managerial skills is sighted as the key contributor to failure of business all over the world. While any attempt to improve such skills should be commended, interventions that do not make a difference should be avoided. The findings of this study proved that intervention through simulation and specifically the ComSim program benefited the knowledge and skills of participants. The impact achieved with a four day simulation suggests to management educators the value of simulation in a safe environment and promotes the development and simulation models for training of specific managerial skills.

The practical nature of this simulation with its high level face-to-face interaction and negotiation creates leverage the knowledge of high-level educators that in is a scarce resource. Often learning takes place in “pockets” but through such a simulation there is high level of integration visible. The reported behavioural changes by participants or the intentions to do so is significant from an educator perspective.

The benefit of this entrepreneurial and management simulation is that participants can safely experiment with different strategies with immediately visible consequences when they receive their quarterly results every few hours. The feedback loop for learning is completed and they are able to reflect on their actions within a short time after making the decisions. Decision-effect relations can be identified and they achieve the metaphorical “aha-experience” several times when connection their decision to its specific outcomes. Participants are able to form a picture of the integrated nature of business operation.

The call for practical management training is answered to some extent by the use of simulation. Few programs have the benefit of proper research results to confirm its claims. However, simulation has its own limitations and is heavily dependent on the learning facilitators. Managers should select carefully for service providers who can facilitate learning and focus on the key concepts relevant to starting and managing a business venture.

Further research in this field may also benefit industry if a model can be construed to evaluate simulation programs. Such a model should contain some elements of objective rating to support the subjective responses of participants. Although no detail evidence was elicited about the role of the facilitators, the results confirmed Pretorius, Nieman and Van Vuuren’s (2005) postulation that the facilitators hold the key to the success when implementing a program such as ComSim.

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