

*The Effectiveness of Business Simulation: A Longitudinal Study*  
 (Keberkesanan Simulasi Perniagaan: Satu Kajian Longitudinal)

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*ABSTRACT*

*Educators, employers and policy makers have been searching for ways to help their student learn to think. In order to assist student to think and solve problems, business educators have turned to business simulation as an alternative way to develop people. Business simulation is a teaching method that can assist in developing a learning environment, which exposes students to complex situations that needs strategic decision-making. At Faculty of Economics and Business UKM, business simulation has been integrated in strategic management course as a platform for students to make management decision in a dynamic environment. A study on 120 students had been conducted to measure the effectiveness of the simulation on a longitudinal basis. Our findings show that some learning occurred in problem solving, financial management, and production management and marketing management fields. Conclusively, business simulation is a worthwhile tool to be integrated in business programs and an effective way to enhance students' knowledge and skills.*

*Keywords:* Business simulation, business games, longitudinal study, strategic management, Malaysia

**ABSTRAK**

Para pendidik, majikan dan pembuat dasar sentiasa mencari jalan untuk membantu para pelajar belajar untuk berfikir. Dalam usaha untuk membantu pelajar berfikir dan menyelesaikan masalah, pendidik di bidang perniagaan telah beralih kepada simulasi perniagaan sebagai cara alternatif dalam meningkatkan daya pemikiran pelajar. Simulasi perniagaan adalah satu kaedah pengajaran yang boleh membantu dalam membangunkan persekitaran pembelajaran yang dapat mendedahkan pelajar kepada situasi yang rumit yang memerlukan mereka membuat keputusan dengan strategik. Di Fakulti Ekonomi dan Pengurusan UKM, simulasi perniagaan telah dimasukkan ke dalam kursus pengurusan strategik sebagai platform kepada pelajar untuk membuat keputusan pengurusan dalam persekitaran yang dinamik. Satu kajian longitudinal ke atas 120 pelajar telah dijalankan untuk mengukur keberkesanan simulasi ini. Penemuan kajian menunjukkan bahawa beberapa pembelajaran berlaku di dalam bidang-bidang penyelesaian masalah, pengurusan kewangan dan pengurusan pemasaran. Kesimpulannya, simulasi perniagaan adalah amat bermanfaat untuk diintegrasikan ke dalam program perniagaan dan ia merupakan cara yang berkesan untuk meningkatkan pengetahuan dan kemahiran pelajar.

Kata kunci: Simulasi perniagaan, permainan perniagaan, kajian longitudinal, pengurusan strategi, Malaysia

## INTRODUCTION

The ability to think critically and solve ill-structured problems has become essential in a competitive world today. As a platform to produce future managers, business school is facing many uphill challenges to meet these issues. A lot of criticisms and comments have been made on the business education and business educators. Business education nowadays is being criticized for being theoretical-driven and lack of critical thinking, creativity and innovation (Hughes, O'Regan & Wornham 2008). Behrman & Levin (1984), clarified that business education have emphasized too much on quantitative analysis, tools and models but little emphasis on qualitative thinking, complex trade-offs and creativity. Management and business education is perceived to be theoretical (Anthony, 1986) and the academic pedagogy is too weak to develop capable managers with the ability to face the challenges of changing environment (Mintzberg 1992).

According to Wilmott (1997), academic approach has little relevancy to real life application and it does not prepare students with the ability to face the business challenges. From the employers' perspectives, they feel that students are entering the business world without the necessary fundamental knowledge, skills and experience that would allow them to resolve real world business problems and function effectively (Arora & Stoner 1992). Corporate sectors have long expected students graduating with business degree that have the knowledge of the theories and concepts but they do also need to know how to apply the theories, concepts and skills to business problems (Chapman & Sorge 1999).

Some finding shows that newly graduated professionals are likely to become proficient in technical skills rather than management skills (McEvery & Blanchard 1999). As such, to deliver future employees with strong problem solving and decision-making skills to the workplace, we must adopt an educational process that improves and cultivates these abilities (Chapman & Sorge, 1999). Business curricula trends are going towards leadership development, communication, team work, diversity, integrated and complex learning model (Ryan, 1999). Further, recent studies on e-learning suggested direct observation and learning actual skills through exchanges and interaction (Huang & Chiu 2015). In an attempt to improve student's decision making and analytic abilities, some business educators have turned to computer-based simulations (Alpert 1993; Hou 2015). This is an opportune decision at the right time and business educators struggle to gain respect for an acceptance of educational games and simulations

(Liao, Huang & Wang 2016; Saunders 1997). At Faculty of Economics and Management, Universiti Kebangsaan Malaysia (UKM), since the 1990's, the faculty has integrated business simulation as part and parcel of the strategic management courseware.

## LITERATURE REVIEW

### History and Development

The direct ancestors of business simulations are war games. Perhaps the most ambitious war games were conducted at the Total War Research Institute and the Naval College of Japan as part of the Japanese preparations for the Second World War. War games have also been used by British and American to test battle strategies and solve military problems (Faria & Dickinson 1994). In 1955, Rand Corporation developed an instructional simulation game which focused on the US Air Force logistics system. The first widely known business decision-making simulation game, Top Management Decision Simulation was developed by the American Management Association in 1956. In 1962, The University of Chicago International Operations Simulation (INTOP) was developed and could be considered the first major business simulation exercise oriented toward the specific problems of international business (Thorelli et. al. 1962). The prime purpose of the simulation was to increase understanding of the problems of international operations in general besides students have to face major classical functional problems such as personnel, finance, marketing, production and R&D. The main advantage of INTOP was the game could force the participant to act as top management decision-makers.

In the decade of 1960's, simulation could help accountancy in four areas such as strategic planning, internal planning, training programs and research purposes (Mead 1966). In 1973, a film-based simulation to increase interaction with a business environment depicted on sound motion pictures was developed (Green & Cotlar 1973). Participants respond to the variety of stimuli presented in the filmed environment. Intuitively, the video-audio-participative (VAP) systems were superior to the conventional methodologies where the systems could generate more active participation in the learning process, allow intense interaction with the type of environment and students can experiment and apply their abstract learning to realistic situations. Nowadays, the development of business simulations are in line with trend of today's information technology (computers, networks, videodisks and multimedia) that

contributes to the realism and the spread of games and simulations in business education (Gunz 1995; Liao, Huang & Wang 2016). As technology become more sophisticated and wide spread, business simulations have become more complex and common (Doyle & Brown 2000). In 1989, a survey by Faria (1989) reported that over 200 business simulation games were being used in approximately 1,733 business schools by nearly 8,600 university professors in USA alone.

### The Learning Opportunities

Many debates and research have been conducted in finding the best teaching methodology. For the proponents of business simulations; simulations and games are presenting learners with a broader experiential learning environment than case studies besides offering learners the best support for active experimentation (Kolb & Lewis 1986). As stated by Cadotte (1995), the paramount objective of business simulation is to help students internalize business thought through the practice of business decision-making. The students also have an opportunity to practice the decision-making process using real-life business scenarios (Chapman & Sorge 1999; Nor Liza, Mohd Hizam & Noor Azuan 2013). In addition, business simulations can solve key competitive problems for industries by giving middle managers a real understanding of the tradeoffs and decision making that goes into strategic planning. On the other hand, business simulations allow business operators to try out different course of actions while learning in a protected environment, on an accelerated time scale of minutes or hours without real financial risks (Rushby 1998). Pray (1987) stated that business simulations allow for vivid understanding of the way various functional areas interrelate and this represents a cost-effective way to develop decision-making skills in manager at all levels.

On the other hand, business simulations provide solution for the training and development problems resolution by strengthening analytical and interpersonal skills in a single training session (Pray & Rabinowitz 1989). Business simulations provide students with the closest experience to a 'real life manager's role which focuses on execution of budgets and cash flows that are continuous and deadline driven. Saunders (1997) found that business simulation creates competition between the different teams. Thus, their decisions not only affect the environment but also the behavior of the other teams. Playing the game, capturing the complexity of reality with its overlapping decisions, deadlines and financial constraints, allows for more varied multitasking on the part of learners and

offers the learner a richer and more robust view of the workplace environment than of the traditional lecture.

### Diversity in Business Simulation

There are a lot of business simulation that have been used in university and the corporate sector. The business simulation software 'Executive' allows students to role play as the management team of a real business performing within a real market condition (Peppercorn 1989), while another software 'Tango' prepares and trains students as a business consultant (Meridith, 2000). Sales Management Simulation (SMS) could be used for sales management courses and sales training programs (Faria & Dickinson 1994) where students make 29 strategic decisions which affects sales force performance. At London Business School, supply chain game was developed as a training aid to understand the complex dynamics of supply chain systems (Braithwaite & Morgans 1993). Ashridge Management College (UK) has designed computer based business simulation to give students a better understanding of crucial elements for success in a complex and changing commercial environment (Fripp 1994).

The 'Markstrat' have been used by many of the world leading business schools in U.S and Europe which had enabled the learning (lecturers, cases, etc) to be applied to a more realistic, but fictitious business environment in improving functional skills. (Thorne 1992). The Management of Strategy in the Market Place, an integrated textbook and simulation, in integrated MBA program was well-received by the business community (Cadotte 1995). The Business Simulation in Master In Management in Indonesia has provided method of illustrating the relationship of managerial decisions to profitability among both students and practicing manager (Hornaday 1993).

In accounting education, Safe Night Out (SNO) simulation has been used in introductory accounting courses. The simulation emphasizes communication skills, alternative viewpoints, and the effect of assumptions on decisions and demonstrate the importance of accounting to business decision makers. This simulation has enabled students to develop their thinking abilities and being the starter to transform the mechanistic, ritualistic computations and vocabulary methods that have long been the mainstay of introductory accounting courses (Springer & Borthick 2004). In other fields, Cornell Restaurant Administration Simulation Exercise (CRASE), a computer driven management simulation exercise had been developed at Cornell University specifically for hospitality students. Until 2001, CRASE have

been used widely in over 100 hospitality management schools around the globe (Curland & Fawcett 2001).

Although business simulations are commonly used in business education, many simulations have been used in schools to teach urban planning and biology, for example 'SimPower' to teach electrical utility (Booker 1993). In corporate sector, General Electric (GE) has used business simulation that focuses on marketing skills and was ranked the most highly-rated courses in GE. Coopers & Lybrand Consulting have developed a business simulation to help managers at telecommunication companies learn how to compete in a rapidly changing business landscape (Filipczak et. al. 1994). Managers learn about pricing, branding, packaging in the ever shifting telecommunications market place.

### The Effectiveness of Business Simulation

Researchers' investigating the effectiveness of simulations in business education has produced contradictory and inconclusive findings (Klein 1984). Brenenstahl (1975) in Klein (1984) found a positive but no significant difference in learning by an experiential learning group using a combination of lecture and business simulation compared to the control group which uses lecture only. Klein (1984) found that simulations were recognized as excellent motivators and as providers of valid decision-making experiences and play a supportive role adding decision-making relevance to the lecturers and text. His study on international business simulation showed that the adoption of an international business simulation will add relevancy and provides an opportunity to exercise the skills and the knowledge acquired.

Cadotte (1995) found several skills were practiced in business simulations such as strategic planning and thinking, management strategy, leadership, teamwork and interpersonal skills, budgeting and cash flow management and understanding and delivering customer value. From the research of Kolb and Lewis (1986), simulations were moderately effective for developing perceptual and symbolic abilities. Similar findings by Solomon (1993) proved that simulation allowed experience to be gained in handling new situations, stimulates discussion of complicated topics and promoting decision making. In a study by Faria & Dickinson (1994) on Sales Management Simulation (SMS), all participants agreed that they like to participate in the simulation competition again, felt that they learned more by having to make decisions in the competition, felt that the SMS competition was very realistic and all agreed that it would be worthwhile for

any experienced sales manager.

The findings of Chapman and Sorge (1999) showed that simulation made the courseware more interesting, helped students apply their lessons in class, overall it was a useful learning tool and students strongly endorsed using simulation for future class. Wolfe and Chanin (1993) findings showed that complex games may teach more than simple games, group play generates higher learning than does single member play, and self-assigned team do not outperform randomly assigned teams. Another study Wolfe and Luethge (2003) found that knowledgeable group (cohesive and engaged) who implemented their strategies perfectly, obtained superior results than uninvolved and copycats groups. Nor Liza et al (2013) found the ability of business simulation in transferring theory into practice, applying multi-disciplinary knowledge, managing team dynamics, making decisions in uncertainties and managing in realistic situation. In addition, Pratt and Hahn (2016) found that students have high expectations with regard to learning from the business simulation.

Despite its advantages, certain Business Simulations did not offer realistic simulations of a corporate financial environment (Cliggott & Goodman 1986). One of the biggest weakness of business simulation is the inability to replicate decision making environment (Wolfe 1976), conditions and forces operating in a real business world (Thorne 1992) and the behavior of learners are tied to a set of decisions that may not reflect reality (Cadotte 1995). Saunders (1997) made further comment that the problems in business simulations are usually clearly defined and well structured, confusing, loss of learner confidence, self-esteem and time consuming. The debates have gone further when some professors argued what percentage of a course grade a simulation should be worth (Anderson & Lawton 1992; Alpert 1993).

## BUSINESS SIMULATION AND STRATEGIC MANAGEMENT COURSE

Courses in strategic management often employ a variety of learning method. Findings by Eldredge and Falloway (1983) showed that a number of methods based upon text, case, management games, field projects and guest speakers have been used in strategic management course. Similar findings by Jennings (1996) found that majority of the strategic management course in United Kingdom have been using a combination method; lecturers with discussion, case studies, guest speakers, tutorials based on current issue, business games, company-based research projects and consultancy

projects. A survey by Faria (1998) of U.S business school education reported that almost 97.5 percent of AACSB (American Assembly of Collegiate Schools of Business) have made some use of simulations.

TABLE-1: Summary of Decisions in Business Simulations

Type of Decisions	Example of Sub-decisions	Number of Decisions
Demand Forecast	Projected rating for quality, service, models, delivery, market share	14-56
Plant purchase / sale / closing	Plant size, region, price	2-4
Production & Labour Decisions	Pairs to be produced, raw materials, styling and features budget, models, wages, incentive, workers employed	26-52
Shipping Decisions	From which plant to which warehouse	8-16
Private Label Marketing Decisions	Pairs offered, bid price, Inventory Liquidation Option (ILO)	3
Internet Marketing Decisions	Price, models, delivery option	3
Branded Marketing Decisions	Wholesale price, advertising budget, rebate, delivery time, service rating, no. of retail outlet, no. of company owned outlet, retailer support service	8-32
Bids For Celebrity Endorsements	Contract offer	0-4
Financing Decisions	Finance and cash flow, short term loan, new bond issues, common stock issue, dividend declaration	3-7
Plant Automation & Construction	New automation option, new plant	0-8
Total		69-185

In strategic management course at Faculty of Economics and Management UKM, the business simulation carried 25% from the overall course assessment. From the 25%, 15% was allocated for company's performance and 10% for business simulation report (company report). The other 75% were allocated for case analysis (25%), mid-semester examination (20%) and final examination (30%). Students would build up their own group (company), from 3 to 6 members per group dependent on the size of the class. The 'Business Strategy Game: A Global Industry Simulation' which were created by Arthur A. Thompson Jr and Gregory J. Stappenbeck has been used to help lecturers obtain the course objectives.

In this simulation, students have to enter 10 types of decision per week and submit their decisions (disks) to be analyzed by course instructor. After analyzing and processing the information, the disks will be given back to students (with the latest development and feedback) and students have to submit back their decisions/

disks at the following week. Summary of decisions is presented in Table 1. Through the simulation system, students will be provided and assisted by industry report, benchmarking report, competitor analysis report and company report. In company report, students have to read, understand, formulate and implement new strategies based on manufacturing report, warehouse report, marketing report, profit analysis report, cost analysis report, income statement, cash flow report and balance sheet.

## RESEARCH OBJECTIVE AND METHODOLOGY

### Objective

This general objective of this paper is to investigate the effectiveness of business simulation from a longitudinal basis. Specifically, this paper is intend:

- To measure the effectiveness of business simulation in terms of problems solving and

thinking capability of the respondents.

- To measure the effectiveness of business simulation in terms of financial management skills acquired by students.
- To measure the effectiveness of business simulation in terms of marketing management knowledge acquired by students.
- To measure the effectiveness of business simulation in terms of production management knowledge acquired by students.

### Methodology

A questionnaire was designed and contained two sections and was subjected to testing in a pilot study. The first section were created customisely through Bloom's Taxonomy perspective and contained 71 questions to reflect functional areas which were i) problem solving and thinking capability (8 questions), ii)financial management (12 questions), iii)production (11 questions), iv)marketing (14 questions), v)business risks (5 questions) and vi)strategic management (21 questions). For the purpose of the study, only 45 questions related to the first four functions will be analyzed in this paper. The second section contained 10 questions about respondents' profile. Ten students have been chosen to answer the pilot questionnaire.

The first questionnaire has been distributed at the beginning of the class. The second questionnaire has been distributed to the same respondents after students have finished their business simulation, usually at the second last week of the class. The majority of the questions relating to the research question were phrased as statements with the possible response continuum

linked to a ten-point Likert scale-style, requesting the respondents to indicate one of five possible reactions to each statement (1 = strongly not understand, 10 = strongly understand). The cronbach alpha for these items was 0.981 before students playing the simulation and 0.988 after they playing the simulation. The Statistical Program For Social Science (SPSS) version 21 was used to calculate all necessary statistics. A total of 120 respondents (students) from strategic management course had answered to the questionnaires.

### FINDINGS AND DISCUSSION

#### Sample

Table 2 exhibits the demographic profiles for the survey respondents. A common pattern of the public university students' population in Malaysia is reflected in this study sample where the female students outnumbered their male counterpart by significantly large margin. Majority of the sample (73.3%) are female and accounting students (59.8%). In terms of CGPA, 4.2% of the respondents obtained CGPA between 2.00 to 2.49, 40.0% of them from 2.50 to 2.99, 52.5% from 3.00 to 3.66 and 3.3% are the first class students. In terms of academic qualification, majority of the respondents were from matriculation (60.8%), HSC (14.2%) and holding a diploma (25%). Finally, working experience has been included as one of the demographic profiles and majority of the students (74.2%) have attended industrial training, 18.3% have involved in part-time job and just 7.5% involved in family business.

TABLE-2: Demographic Profile of Respondents

Demographic Characteristics	Subgroup	Total of Respondent	Percentage
Gender	Male	32	23.5
	Female	88	76.5
Program	Business Program	50	40.2
	Accounting Program	70	59.8
C.G.P.A	2.00 – 2.49	5	4.2
	2.50 - 2.99	48	40.0
	3.00 – 3.66	63	52.5
	> 3.66	4	3.3
Academic Qualification	Matriculation	73	60.8
	HSC	17	14.2
	Diploma	30	25.0
Working Experience	Industrial training only	89	74.2
	Part time job during break	22	18.3
	Involve in family business	9	7.5

### Findings

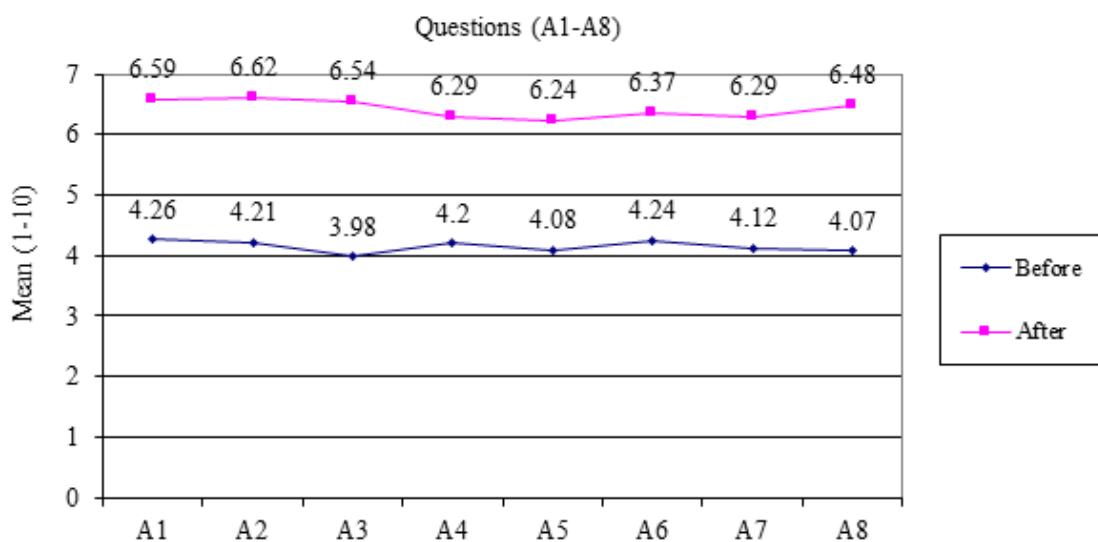
In measuring the problem solving and thinking capability of the students, eight questions have been constructed (see Table 3). Four questions measured problem solving (A1, A2, A3 and A8) and four questions measured thinking capability (A4, A5, A6, A7). The lowest mean before students playing the simulation is 'understand real issue faced by company' (mean= 3.98) and the highest is 'know issue and problems of a company' (mean=4.26). After playing the simulation, all variables showed some improvements. The highest

mean for problem solving is on 'understand issue faced by company' (mean=6.62) and the highest mean for thinking capability is on 'thinking strategically about current situation of a company' (mean=6.37). By the way, the most significant difference between before and after playing the game is 'understand real issue faced by company' (mean difference=2.56). The results prove that business simulation has given some impact to the students' problem solving skills and thinking capability of business company (overall mean=6.427; mean difference 2.282).

TABLE-3: Results for Problem Solving and Thinking Capability

Questions	Mean Before	Std. Dev Before	Mean After	Std. Dev After
A1. Knows issue & problem of company	4.26	1.494	6.59	1.564
A2. Understand issue faced by company	4.21	1.548	6.62	1.518
A3. Understand real issue faced by company	3.98	1.529	6.54	1.655
A4. Capability on analytical thinking	4.20	1.484	6.29	1.617
A5. Capability on critical thinking	4.08	1.398	6.24	1.566
A6. Thinking strategically about current situation of a company	4.24	1.438	6.37	1.478
A7. Thinking strategically about future situation of a company	4.12	1.419	6.29	1.590
A8. Solving issue and problem faced by company	4.07	1.557	6.48	1.603
Overall	4.145	1.483	6.427	1.573

FIGURE 1: Means for Problem Solving & Thinking Capability



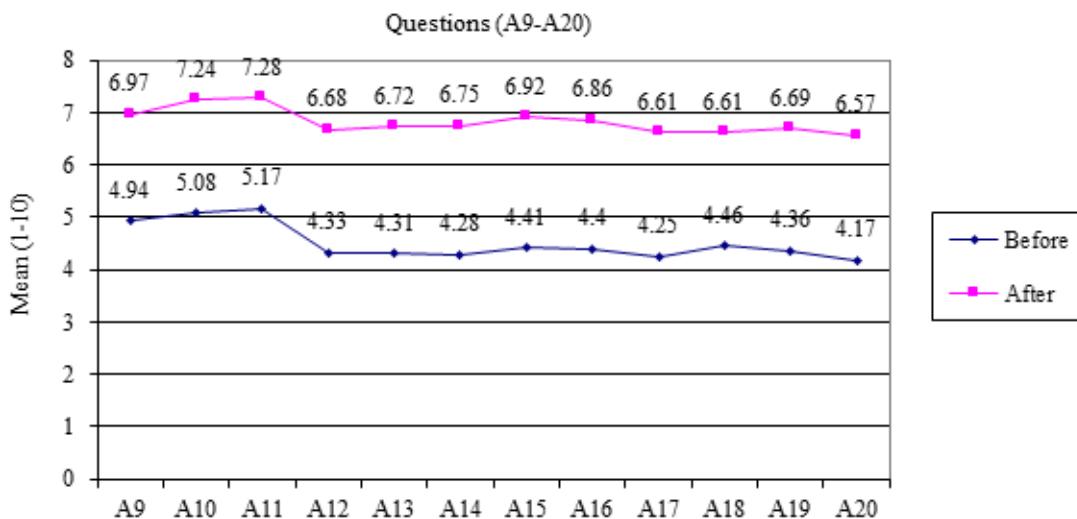
12 questions have been constructed to measure the effectiveness of business simulation to financial management skills acquired by students (see Table 4). Three questions measured 'know and understand' level

(A9,A10,A11), two questions measured 'application' level (A12,A13), three questions measured 'analysis' level (A14,A15,A16) and four questions measured 'evaluation' level (A17,A18,A19,A20).

TABLE-4: Results For Financial Management Skills

Questions	Mean Before	Std. Dev Before	Mean After	Std. Dev After
A9. Know and understand about cash flow report	4.94	1.280	6.97	1.675
A10. Know and understand about profit and loss statement	5.08	1.297	7.24	1.656
A11. Know and understand about balance sheet	5.17	1.263	7.28	1.551
A12. Managing company budget	4.33	1.219	6.68	1.680
A13. Managing company cash flow	4.31	1.185	6.72	1.731
A14. Analyzing cash flow report	4.28	1.201	6.75	1.699
A15. Analyzing profit and loss statement	4.41	1.256	6.92	1.653
A16. Analyzing balance sheet	4.40	1.270	6.86	1.626
A17. Assess cash flow report in making decision	4.25	1.087	6.61	1.580
A18. Assess profit and loss statement in making decision	4.46	1.168	6.61	1.653
A19. Assess balance sheet in making decision	4.36	1.169	6.69	1.592
A20. Solving financial problems faced by company	4.17	1.167	6.57	1.692
Overall	4.51	1.2135	6.825	1.649

FIGURE-2: Means for Financial Management



As we can see in Figure 2, the pattern for means before and after playing the simulation is same. Before playing the simulation, the lowest mean is ‘solving financial problems faced by company’ (mean=4.17) which is in ‘evaluation level’ and the highest mean is ‘know and understand about balance sheet’ (mean =5.17) which is in know and understand level’. After playing the simulation, the lowest mean remain same (solving financial problems faced by company; mean=6.57) and the highest mean also remain same (know and understand about balance sheet; mean=7.28). The biggest changes are in ‘analyzing profit and loss

statement’ (mean difference =2.51), followed by ‘analyzing cash flow report’ (mean difference=2.47) and ‘analyzing balance sheet (mean difference=2.46).

In terms of Bloom’s Taxonomy level, the average mean for ‘Know and understand level’ has changed from 5.06 to 7.16, an increased of 2.10. The Application Level has an average of mean of 4.32 at the beginning and changed to 6.70 at the end, an increased of 2.38. The Analysis Level has the biggest increase from an average mean of 4.36 at the beginning to 6.84 at the end, an increased of 2.48. Lastly, the Evaluation level has the third increase from 4.31 to 6.62, an

increased of 2.31. As we analyze, the average mean has decreased slightly over the level, except for the Analysis level which is higher than Application Level.

The results show that the simulation has biggest impact on Analysis Level as the nature of the simulation need students to do a lot of financial analysis.

TABLE-5: Results for Production Management

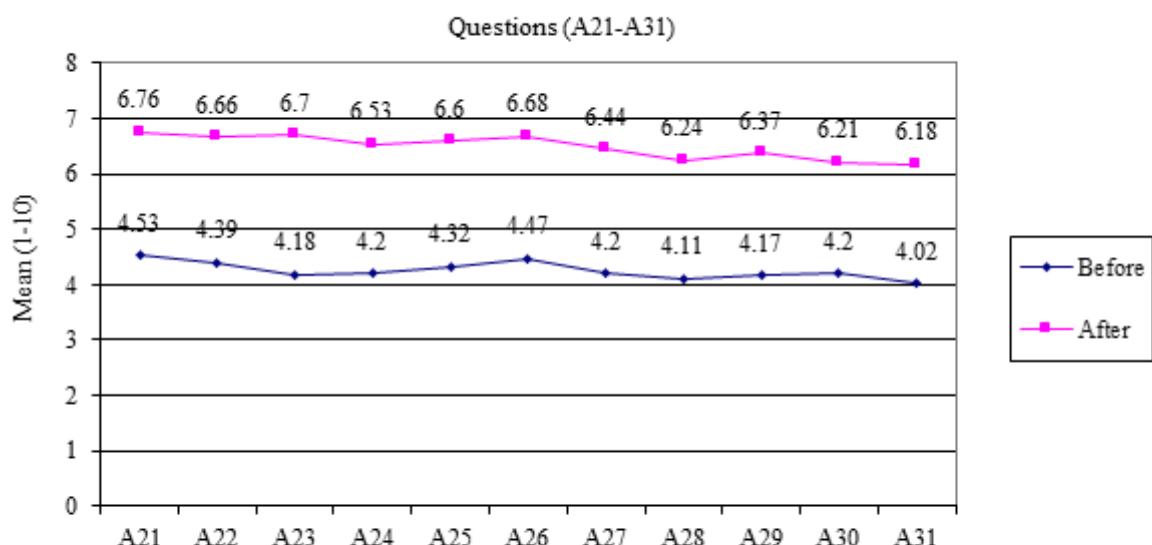
Questions	Mean Before	Std. Dev Before	Mean After	Std. Dev After
A21. Know the process in producing a product	4.53	1.289	6.76	1.545
A22. Know the capability and effect of machine to company's production	4.39	1.478	6.66	1.537
A23. Know the optimum matching between man and machine	4.18	1.323	6.70	1.559
A24. Forecasting demand for a product of a company	4.20	1.313	6.53	1.489
A25.Understand operation management in manufacturing company	4.32	1.293	6.60	1.537
A26. Understand the relationship of employee, raw materials and machine in manufacturing company	4.47	1.269	6.68	1.557
A27. Managing operation of a manufacturing company	4.20	1.255	6.44	1.533
A28. Integrating multi-functional in manufacturing company in making decision	4.11	1.327	6.24	1.582
A29. Analyzing problems faced by manufacturing operation	4.17	1.185	6.37	1.625
A30. Assessing the efficiency and effectiveness of manufacturing company	4.20	1.292	6.21	1.566
A31. Solving problem relating to operation issue	4.02	1.219	6.18	1.708
Overall	4.25	1.295	6.49	1.567

A total of 11 questions have been constructed in measuring the effectiveness of business simulation from production management aspect (see Table 5). Six questions measured 'know and understand' level (A21A22,A23,A24,A25&A26), two questions measured 'application' level (A27&A28), one question

measured 'analysis' level (A29) and two questions measured 'evaluation' level (A30&A31).

As we can see in Figure 3, the pattern for means before and after playing the simulation is almost same. Before playing the simulation, the lowest mean is 'solving problems relating to operation

FIGURE-3 : Means For Production Management



issue' (mean=4.02) which is in 'evaluation level' and the highest mean is 'know the process in producing a product (mean =4.53) which is in 'know and understand level'. After playing the simulation, the lowest mean remain same (solving problems relating to operation issue; mean=6.18) and the highest mean also remain same (know the process in producing a product; mean=6.76). The biggest changes are in 'Know the optimum matching between man and machine (mean difference =2.52), followed by 'Forecasting demand for a product of a company' (mean difference=2.33) and 'Understand operation management in manufacturing company (mean difference=2.28). In terms of Bloom's Taxonomy level, the average mean for 'Know and understand level' has the biggest increased from 4.34 to 6.65, an increase of 2.31. The Application Level has an average of mean of 4.15 at the beginning and changed to 6.34 at the end, an increase of 2.19. The Analysis Level has increased from an average mean of

4.17 at the beginning to 6.37 at the end, an increase of 2.20. Lastly, the Evaluation level has the third increased from 4.11 to 6.19, an increase of 2.08. As we analyze, the average mean has decreased slightly over the level, except for the Analysis level which is higher than Application Level. These results show that the simulation has biggest impact on Know and Understand Level as most of the students have little experience in manufacturing business and the simulation has given them some insights of manufacturing company.

In measuring the effectiveness of business simulation to the marketing management skills acquired by students, 14 questions have been constructed (see Table 6). Four questions measured 'know and understand' level (A32, A33, and A34&A35), four questions measured Application Level (A36, A37, and A38&A39), four questions measured Analysis level (A40,A41, and A42&A43) and two questions measured Evaluation Level (A44&A45).

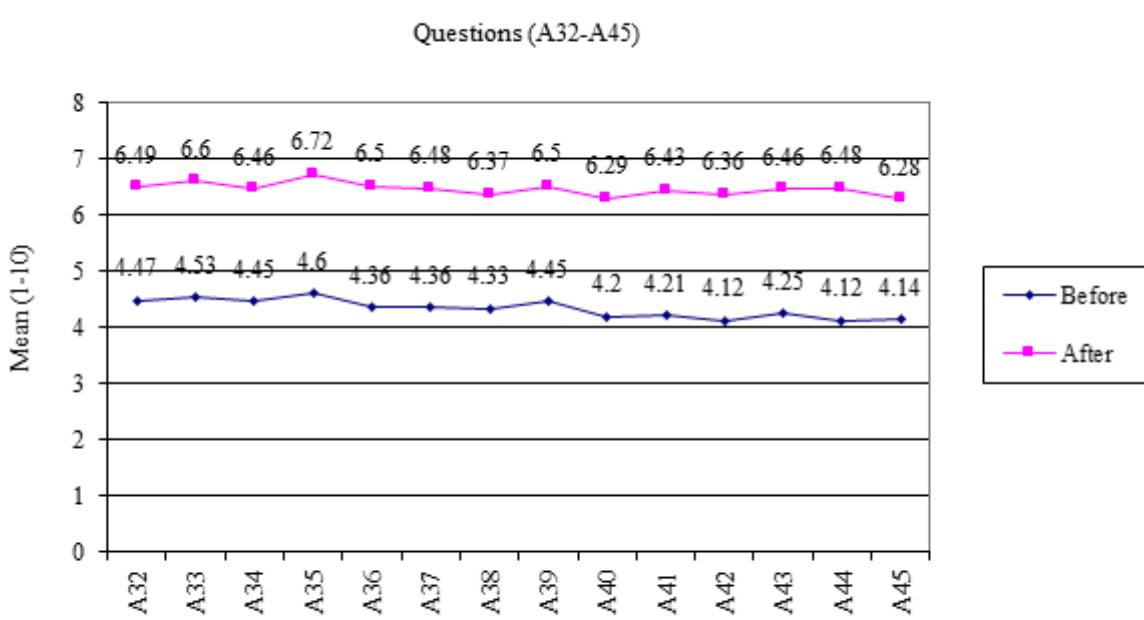
TABLE-6: Results for Marketing Management

Questions	Mean Before	Std. Dev Before	Mean After	Std. Dev After
A32. Understand product strategy	4.47	1.208	6.49	1.545
A33. Understand pricing strategy	4.53	1.156	6.60	1.497
A34. Understand distribution strategy	4.45	1.126	6.46	1.495
A35. Understand promotion strategy	4.60	1.123	6.72	1.391
A36. Implementing product strategy for a company	4.36	1.185	6.50	1.449
A37. Implementing pricing strategy for a company	4.36	1.185	6.48	1.567
A38. Implementing distribution strategy for a company	4.33	1.227	6.37	1.614
A39. Implementing promotion strategy for a company	4.45	1.167	6.50	1.506
A40. Analyzing the effectiveness of product strategy executed by company	4.20	1.133	6.29	1.498
A41. Analyzing the effectiveness of pricing strategy executed by company	4.21	1.244	6.43	1.587
A42. Analyzing the effectiveness of distribution strategy executed by company	4.12	1.219	6.36	1.442
A43. Analyzing the effectiveness of promotion strategy executed by company	4.25	1.142	6.46	1.528
A44. Assessing overall marketing strategy for a company	4.12	1.079	6.48	1.523
A45. Solving marketing problems faced by company	4.14	1.253	6.28	1.534
Overall	4.33	1.17	6.46	1.51

As we can see in Figure 4, the pattern for means before and after playing the simulation is almost same. Before playing the simulation, the lowest mean is 'Assessing overall marketing strategy for a company' (mean=4.12) which is in 'evaluation level' and the highest mean is 'Know and understand promotion

strategy for a company (mean =4.60) which is in 'know and understand level'. After playing the simulation, the lowest mean has changed to 'Solving marketing problems faced by company remain' which is also in Evaluation Level (mean=6.28) but the highest mean remain same (Know and understand promotion strategy

FIGURE-4: Means for Marketing Management



for a company; mean=6.72). The biggest changes are in 'Assessing overall marketing strategy for a company (mean difference =2.36), followed by 'Analyzing the effectiveness of distribution strategy executed by company' (mean difference=2.24) and 'Analyzing the effectiveness of pricing strategy executed by company (mean difference=2.22).

In terms of Bloom's Taxonomy level, the average mean for 'Know and understand level' has increased from 4.51 to 6.57, an increase of 2.06. The Application Level has an average of mean of 4.37 at the beginning and changed to 6.46 at the end, an increase of 2.09. The Analysis Level has increased from an average mean of 4.19 at the beginning to 6.38 at the end, an increase of 2.19. Lastly, the Evaluation level has the biggest increased from 4.13 to 6.38, an increase of 2.25. As we analyze, the average mean has increased slightly over the level, moved oppositely from the analyze before. These results show that business simulation can give an impact to the Evaluation Level. In this case, the impact might be greater as marketing strategy played the biggest roles in determining the competitiveness of students' companies in the simulation.

### Discussion

From the findings described before, some issues arise. It is clear that business simulation can increase students' awareness of actual issues and problems faced by company make them thinking strategically about company current situation and future direction, thus increase their ability to discuss issues academically, practically and intelligently (Chapman and Sorge,

1999). The findings of first objective of this study are in line with findings by Cadotte (1995) that students acquire strategic thinking besides findings by Pray & Rabinowitz (1989) and Jennings (2002) that business simulation strengthening students' analytical and problem-solving skills.

Furthermore, business simulation is an effective way in developing decision-making skills among students as suggested by Pray (1987). With RM50 investment by a group of students and commitment from lecturers in 12 weeks, the students gain more knowledge and skills than expected. Students have to make more than 100 decisions per week and therefore, make them more experience with decision-making (Klein 1984; Solomon 1993). With the simulation used in this course, students applied directly their abstract learning to realistic situation when make a decision (Green and Cotlar 1975; Klein 1984; Jennings 2002).

In terms of financial management, the challenge is heavy. In accounting and finance classes, the students learn about the theories and how to get better score in their examination. In simulation, the situation is different. The students' tasks and responsibility are not to prepare financial statement and others but how to interpret financial statement and how to have better financial statement in forecasted years. The results discussed before (Table-3 & Figure-2) prove that the students learn more in 'analysis' aspect in financial management.

In production management aspect, the impact of business simulation to students' knowledge and skills are proven. All variables showed an improvement in mean scores and directly reflect that students have

better understanding of production management and the interrelation of production activities with other functional activities as mentioned by Pray (1987) and Jennings (2002). In the aspect of marketing management, 14 variables have been studied in answering the last objective. All variables constructed showed an improvements after students playing the simulation. As the students gain top management perspective in playing the simulation, they learn on how to plan and change (Jennings 2002).

Briefly, the simulation has exposed students to broader experiential learning environment than traditional environment (Kolb and Lewis, 1986). The experience gained by course instructors throughout the process show that business simulation makes the course work more interesting (Chapman and Sorge 1999). Through the longitudinal study, business simulation is proven as a useful learning tool (Chapman and Sorge, 1999) and effectively worthwhile to be integrated in a course (Fripp, 1994).

#### Limitations

Some limitations of the study should be known. Firstly, the study is relevant with the simulation that were created by Thompson and Stappenbeck (2003) and not applied with the other simulations. Then all respondents were from UKM and could not represent the whole business students in Malaysia.

#### CONCLUSION AND SUGGESTION

From this study, we find that business simulation is exceptionally worthwhile tool to be exploited in business courses and we strongly recommend to the other institutions in Malaysia and other countries to integrate simulation in other courses. The simulation will prepare students with additional relevant and necessary skills, know how in knowledge application, have the experience of complexities and opportunity to neutralize some misperception from the corporate sector about business education. The lecturers should resolve minor problems relating to the simulation manual and enhance the approach used in the lecture hall especially to bring the whole person into play complete with feelings, attitudes and cognitive aspects (Hoover (1975) in Klein 1984).

In finding the most effective business simulation, Peppcorn (1989) and Filipeczak (1994) suggested some criteria like being worth doing in its own right, memorable and relevant, motivational, exciting and realistic yet simple to use and understand, user

friendly, experiential in nature, convenient to use and cost-effective. As many studies of business simulation and simulation gathered information after respondents ending the game, this study has given new insights from a longitudinal basis. This study proved that students learned and experienced meaningful challenge in terms of management knowledge and skills when they played the business simulation.

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