Simulation as a pedagogical tool: Measurement of impact on perceived effective learning

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A B S T R A C T

This paper studied the impact of simulation as a pedagogical tool on perceived effective learning. The three factors considered had differential impact on perceived effective learning measured in the form of integrated learning and decision making. Data were collected from a sample of students completing their first year of study at a b-school in India. It was found that team dynamics emerged as the most important dimension followed by instructor’s role and learning process. The activities in simulation exercises which enhance team cohesiveness and effective role playing are detrimental for the perception of positive effective learning.

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1. Introduction

Management courses are taught across various business schools using different pedagogies like case study, lecture, role play, simulation etc. Over the years attempts have been made to refine these methods in linking the theory to practice which has become more or less compulsory in business education environment. Simulation as a pedagogical tool is being increasingly adopted by b-schools and industry all over the world (Abodor & Daneshfar, 2006). Besides offering an advantage of linking the learning environment with the actual environment, simulations fulfill the objectives of promoting integrative learning and enhancing team development. This phenomenon is also supported by the fact that many experts have been increasingly criticizing management education for not adequately preparing the students to shoulder the responsibility of a complex business world (Poisson-de Haro & Turgut, 2012). The aim of this study is to identify the impact of simulation as pedagogy on effective learning inculcated by students undergoing these simulations based exercises.

Datar, Garwin, and Cullen (2010) in their book ‘Rethinking the MBA: Business education at Crossroads’ have also emphasized the need for making the MBA program more application oriented. They suggest that MBA graduates require a more 'global perspective', 'leadership abilities' and 'integration skills'; besides teaching them 'organizational realities', to think creatively and innovatively, to write and speak well. Simultaneously, this popularity for simulation has created an imperative for rigorous, theory based research into the factors and dynamics affecting the effectiveness of simulation.
exercises (Abodor & Daneshfar, 2006). The two specific objectives dealt in this paper are to create dimensions of perceived effective learning and factors influencing it and to analyze the relationship between the factors and perceived effective learning.

2. Literature review

Management as a field of study has been struggling in terms of combining theory and practice and ensuring that the learning is captured by doing so. The value of supplementary theoretical knowledge with hands-on real world appreciation of the subject being studied is especially relevant in the field of business studies since business students eventually have to face that very real world for which they are being trained (Parks & Lindstrom, 1995).

Business simulations or simulation exercises are widely used across business courses (Faria, 1998, 2001; Keeffe, Dyson, & Edwards, 1993), such as business strategy (Stephen, Parente, & Brown, 2002), business ethics (Wolfe & Fritzsche, 1998), and courses on cultural differences (Chatman & Barsade, 1995).

In contrast to traditional teaching methods, business simulations bridge the gap between the classroom and the world of real-life business decision making through experiential learning experiences in which students design, implement, and control business strategies. Thus, the recurring effort is to understand what ensures effective learning among students through the use of simulation as pedagogy.

A simulation is a method of teaching/learning or evaluating learning of curricular content that is based on an actual situation (Cilchot, 2001). The simulation is designed to replicate a real-life situation as closely as desired; wherein the students have to assume roles as they analyze situation and make decisions. As the simulation proceeds, students respond to the changes by comprehending the consequences of their decisions and determine future actions based on that. A simulation often includes time for reflecting on the decisions and processes involved therein, and the instructor also allows students to share their experiences, assess their learning and evaluate their assessments against the intended outcomes of the simulation. In other words, ‘debriefing sessions’ are an important component of simulations and should be well planned, provide closure and focus on learning outcomes.

In today’s business school scenario simulation has been widely accepted as a dominant teaching pedagogy across the globe. It is felt to have succeeded in reducing the detachment between theory and practice and ensuring that the learning is captured by doing so. The value of supplementary theoretical knowledge with hands-on real world appreciation of the subject being studied is especially relevant in the field of business study since business students eventually have to face that very real world for which they are being trained (Parks & Lindstrom, 1995). Management as a field of study has been struggling in terms of inculcating practical skills by means of simulating actual business environment.

Business simulations or simulation exercises are widely used across business courses (Faria, 1998, 2001; Keeffe et al., 1993), such as business strategy (Stephen et al., 2002), business ethics (Wolfe & Fritzsche, 1998), and courses on cultural differences (Chatman & Barsade, 1995). Most of the leading business schools have introduced simulation workshops or incorporated it as part of different courses offered to students (Abodor & Daneshfar, 2006). In this regard the source for these simulations are established management education institutes like Harvard Business School and professional private companies who train using specialized software and instruction resources. Crookall (1997) commented on the increasing use of simulations, “the area of business education and training has probably overtaken all other areas … in the application of simulation/gaming” (1997: 357).

Prior research has demonstrated that there are some well-grounded advantages and benefits associated with management games and simulations. In addition, simulation as a pedagogy has been compared with other teaching pedagogies and relative contrasts have been drawn (Kayes, 2002). Broadly simulations, in management students aim to ensure effective learning as comprised of two critical skills — ability to integrate concepts and ability to make decisions. Thus students demonstrating these two abilities in an actual business scenario can be said to have ‘learnt’ the course effectively. However, since we are not able to observe students in their actual workplace (once they complete their course) demonstrating these skills, hence we use the term ‘perceived effective learning’. The authors have accordingly developed the items under the dimensions of integrated learning and decision making. The authors decided to study both the dimensions since prior studies have not taken these two dimensions together for study. Moreover, as we shall see further in this article, the dimensions which influence perceived effective learning have been studied in a fragmented manner. The present research therefore, seeks to bridge some of the gaps in research by proposing and empirically testing the influence of three major dimensions — learning process, role of the instructor and team dynamics on the dimensions constituting perceived effective learning i.e. integrated learning and decision making.

2.1. Learning process

The learning process refers to the design and structure of the simulation case study. Depending on the learning outcomes and objectives desired by instructors, Wolfe and Rogé (1997) concluded that simulations provide a rich learning environment

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3 The authors have used the term perceived effective learning since effective learning can only be studied through longitudinal studies; hence an attempt is made to study the perceived effective learning using simulation as pedagogy.
that allows students to experience team decision making and analyze the relative merits of different decisions over a number of decision periods. Faria (2001), in a review of over 25 years of research and writing on simulations, concluded that the most current interest focuses on the educational value of simulations (their effectiveness) and determining what, in fact, simulations teach.

Another dimension to be considered for simulations is that they are built on a computer-based platform with eye-popping features. This makes simulation a powerful teaching tool in motivating students (Thomas, 1998), since it conveys a sense of enjoyment in a game-like computer environment. The learning process elaborated through simulation modules generates interest and motivates the participants in an active manner. The way simulations are designed, they can be motivating and the enthusiasm among the students becomes contagious (Cilchot, 2001). Students feel that they are solving problems and making decisions as it is done in adult world.

Students' themselves influence the learning experience through their expectations, learning styles or preference or motives. Wellington and Faria (1996) found that students who performed poorly in the simulation had very different attitudes from the better performers. Poor performers enjoyed simulation experience less as they did not believe that their simulation performance accurately reflected their managerial ability and they perceived less educational benefit. Besides, satisfaction with a simulation experience is not only a function of the attributes of the simulation itself or how it is administered, but also a function of an individual's characteristic traits (Walters & Coalter, 1997). In another study by Gosenpud (1987) there is a positive correlation between simulation performance and students’ desire and interest in participating simulation. However, Wolfe and Box (1987) suggested that it is not at all clear that performance is related to the amount of time spent in making the required decisions for various rounds.

Simulations create automatic financial statements and other data reports; hence students are not required to know how these reports are created. In addition, students tend to make decisions mechanically since simulations are designed to take care of tricky situations for instance; overdraft loans or emergency loans are automatically granted by the system without any financial planning. These mechanized features ease running a firm and leave very little for the students to act on. Hence, students can attain an excellent simulation performance regardless of learning the crucial skills involved in managing the firm (Poisson-de Haro & Turgut, 2012). Moreover it is difficult for students to extract all lessons at once from their simulation experience (Wheatley, Hornaday, & Hunt, 1988). This is because a simulation is simplified reality. The more interventions are introduced in a simulation, the more complex it gets and the learning process becomes slow.

### 2.2. Instructor's role

From the viewpoint of instructors, the pedagogical advantages of using simulations for management education include motivation (stimulating and enjoyable environment), teamwork (demonstrate and develop), a risk-free environment (for decision making that could not be attempted at work), variety (complements other methods such as case study and lecture) and experiential learning (provides immediate feedback to see the consequences of decision making) (Fripp, 1997; Thompson, Purdy, & Fandt, 1997). The role of the instructor becomes very important in creation of business environment and also to provide adequate feedbacks for a meaningful learning for the participants (Cadotte, 1995; Knotts & Keys, 1997). Studies have shown that an instructor's role is a critical factor in determining effectiveness of simulations. However there are hardly any studies on how to improve the instructor's use of simulation to increase the simulation's effectiveness (Wolfe, 1997). Knotts and Keys (1997) too stress that the factors chosen by the instructor are critical to the effectiveness of simulations. For instance, the team size as decided by the instructor and the grading components are designed by the instructors. Cadotte (1995) says that even the type and amount of feedback, and the debriefing from the instructor can be critical to the learning experience.

### 2.3. Team dynamics

Simulations have been popularly used to develop teamwork skills among the students. Lamont (2001) has argued that simulation should be used to teach teamwork and collaborative relationship skills and not just functional knowledge. Since students participate in simulations in groups or teams, it is worthwhile to understand the effect of team related factors on the effective learning experience. Team cohesiveness has been widely studied in terms of predicting simulation performance (Gosenpud, 1987). Highly cohesive groups are thought to be more effective, because the group can divert its energy toward accomplishment of its goals rather than expending energy in dealing with or managing internal conflict (Gosenpud, 1987). However, though it appears that cohesiveness has an impact on student performance; it is not known whether cohesiveness affects students’ perception of the educational value of the simulation experience (Coffey & Anderson, 2006). In a study by Walters and Coalter (1997), teams with higher levels of consensus expressed greater satisfaction with their group. The exercises involving simulation involves lot of teamwork and hence the learning would be determined by the performance of the groups as a functional team. Besides, team cohesiveness, team size also has an effect on team performance and individual team member satisfaction (Cossé, Ashworth, & Weisenberger, 1999; Walters & Coalter, 1997). Prior research has also indicated that there are assets and liabilities associated with teams. For example, teams can stifle creativity, encourage free riding and conflict. The atmosphere in a team, including trust and cooperation can also affect team performance (Kramer, 1999). At the same time, teams can promote rich diversity of ideas and enhance the quality of decisions.
2.4. Integrated learning

In particular, simulations have been widely used for the teaching of strategic management (Faria, 2001; Keys, 1997; Knotts & Keys, 1997; Wolfe, 1997; Wolfe & Rogé, 1997). For example, simulations have been used to integrate functional areas of business, provide knowledge of the strategic management process and enhance team skill development. In a review of a sample of commonly available strategic management simulations, Wolfe and Rogé (1997) found that a number of the simulations promoted an understanding of strategic management’s general knowledge domain and the field’s unique analytical tools and techniques.

The strategic management course offered under the management programs is considered as a capstone course that integrates all functional and basic courses in order to provide an integrated perspective of an organization. A course in strategy intends to show the students, ‘how everything fits together’ and ‘how to think and make decisions like a senior manager (Rapert, Smith, Valliquette, & Garretson, 2004). Hence the course is taught not just using lectures, but other experiential learning methods especially case studies. Case studies in a strategy course allow the students to put themselves in the shoes of real managers and think posteriori about what decisions or recommendations could have been taken or made (Dean & Fornaciari, 2002). In this sense, simulations are considered appropriate to teach strategy courses (Kayes, 2002). However, concerns are raised about which competencies are needed to be an effective manager and then choosing the appropriate teaching methods are critical (Boyatzis, 2008). Will simulations provide an answer to these concerns is yet to be seen, because given the unique nature of the strategy course; it becomes an analytical process incorporating multiple perspectives. It has to encourage interaction among students and provide them a platform for improving their oral and written communication skills as well. Currently, in the high velocity business environment students need to sharpen their integration skills along with critical thinking skills while the case studies are able to develop the latter, the former set of skills can be effectively developed through simulations. Besides, simulations allow students to learn from their own mistakes rather than from other’s mistakes.

Poisson-de Haro and Turgut (2012) also warn that over-attachment to or over emphasis of simulation can disrupt the learning objectives of a strategy course. For instance, some students may focus their attention to achievement through decoding the simulation algorithm rather than understanding the true nature of relationships among different elements in strategic decision making. In such instances, students treat the simulation initially as a form of entertainment when developing and practicing skills related to theoretical applied and practical integration loses priority.

Authors have also suggested that while simulations are useful in developing analytical skills (Wolfe, 1997), they do not prepare students to handle other issues such as ethical decision making (Kachra & Schnietz, 2008). Seaton and Boyd (2008) say that while many MBA instructors are using simulations as a part of their teaching methodology, only 22% of MBA students polled stated that their b-schools were adequately preparing them ethically for the professional environment. In addition, there has been growing concern among the students that not only is a simulation lacking in ethical perspective but also in global perspective. The companies that students strategically managed in a simulation were domestic companies which competed against other domestic companies (Seaton & Boyd, 2008). Hence while these simulations may be fulfilling the teaching objectives, they are definitely weakened by a lack of global perspective that is so relevant in today’s business environment (Tempel & Walgenbach, 2007). Moreover, increasingly void is emerging even in simulations viz. the linking of academic environment to the professional environment is almost always lacking in the hands on experience of the actual implementation of a strategy, idea or theory. So even while using simulations where the linkage between academic and professional environments is strong, the ‘implementation element’ is missing (Seaton & Boyd, 2008). Students thus, may get disenchanted with the results despite their engagement with the process, since they realize that what they would be experiencing in reality would be more complex.

2.5. Decision making

As simulations can be designed to replicate dynamic actual economic, market and business events, they help students to understand and augment or experience management concepts and the interrelationships among the various functions of business with alignment and commitment surrounding various corporate strategies, business models and initiatives. Simulations also develop intuition and problem solving skills, in the context of real complex, and ill structured business problems and including flexibility and application in the communication of knowledge for use in different situations that requires analysis from multiple perspectives and articulation of knowledge. Simulation addresses the lack of opportunities to learn real problem solving by actively involving students in the decision making process of business issues (Clarke, 2009).

Simulations are known to enhance students’ planning and decision making skills (Wellington & Faria, 1996), besides other skills like time management, team building and negotiation skills (Doyle & Brown, 2000; Knotts & Keys, 1997). However, there is little research to show that simulations lead to higher levels of knowledge gains than other teaching techniques, including case studies (Wolfe, 1997).

For some of the researchers (Faria, 2001; McLaughlin & Bryant, 1987), in spite of the popularity of business simulations, various questions about their educational value or effectiveness have not been adequately answered. In fact one of the expected outcomes by doing simulation is the enhancement of decision making skills and this can even be treated as a surrogate for effective learning. While we know how students perform on business simulations in terms of their ranking on the simulation results and what impacts their performance, we know less about how students value the simulation experience and the learning that occurs (Coffey & Anderson, 2006).
The literature review reveals the variables involving simulation as a pedagogical tool and also how various authors have critically looked at the improvement in performance by virtue of using simulation in comparison to other traditional pedagogical tools. The performance measures identified were surrogates for effective learning, which was measured using time series study but not on the perception of the participants after the simulation exercises are completed. Moreover studies have also controlled for the effect of demographic variables like age, gender, work experience, etc.

3. Research framework

Based on the previous studies we could broadly identify five dimensions related to the simulation process and the assessment of performance. The first dimension ascertained is the learning process which determines how the exercises are conducted. Simulation gives them a forum in which creative, divergent thinking is legitimized and valued. Their interest spills over into out-of-class discussions with other students when they share ideas, they are bubbling with enthusiasm; and they often describe this kind of learning as authentic and not boring (Cilchot, 2001). Team dynamics emerges as an important dimension for successfully completing the simulation exercises. A highly cohesive work group has been accepted as a prerequisite for both learning and performance of simulation (Wolfe & Box, 1987). Instructor’s role is identified as the third dimension which is crucial for leading a successful simulation. It has been cited that thought provoking game like situations help instructors stimulate students’ interests in the learning material and generates involvement and enthusiasm in the learning process (Poisson-de Haro & Turgut, 2012). Measuring the enhancement in performance or the effective learning is the challenging aspect seen across literature. In general we could identify two dimensions which can act as the proxy for the perceived effective learning. By participating in simulations, students get an opportunity to analyze and solve complex problems and also to integrate material that they have learned across disciplines (Cadotte, 1995; Lamont, 2001). Integrated learning can be thus considered as the fourth dimension. The most important outcome expected as an effective learning is the ability to make decisions in complex business environment. Students can understand the complexity of decision making since they are exposed to a simulated environment that reflects real life (Parks & Lindstrom, 1995). Hence the last dimension identified is the decision making which along with integrated learning is to be treated as a surrogate for perceived effective learning. The initial three dimensions namely ‘Learning process, Team dynamics and Instructors role’ constitute the set of independent variables influencing integrated learning and decision making skills. The authors have also included three demographic variables namely age, gender, and work experience which might have an influence on the dependent variable. The research framework for the study was based on these parameters (Fig. 1).

3.1. Research design

In the present study simulation is considered to be a pedagogical tool that enhances perceived effective learning. Perceived effective learning is defined as a belief of the student, running the simulation, which he/she is able to integrate management theory and concepts he/she has acquired over the year and that helps him/her in business decision making. Thus effective learning is measured using two dimensions namely integrated learning and decision making skill. The sample consisted of first year students from the postgraduate diploma in management program spanning over two years in a business school. The program curriculum is designed in such a way that students are expected to go through compulsory courses on Finance, Marketing, Human Resources, Operations and Information Technology during the first year and opt for more specialized electives in the second year of their study. The strategy course by way of simulation is positioned at the close of the first year to enable students to test their integration, application and business decision making capacity. Majority of these students are

![Fig. 1. Research framework for ‘perceived effective learning through simulation pedagogy’ and other factors affecting it.](image-url)
engineers with around two years of experience mostly from software industry on the technical side, and have no prior experience of knowledge of designing, mapping or implementing strategy.

The tool of data collection was a structured questionnaire comprising a 5 point Likert scale where 1 was strongly agree and 5 was strongly disagree. The scale constituted of 34 items covering five dimensions namely Instructors role, Team dynamics, Learning process, Integrated learning and Decision making skills. Apart from the agreement scale, demographic data of the participants like age, gender and work experience it also included a few open ended questions relating to the views, experience etc. about simulation as a pedagogical tool.

Data were collected online and the questionnaire was circulated to the entire batch of 400 students who participated in the strategy simulation course — “Cross functional simulation for leadership and decision making”. In this three day workshop, the students were given a case study on a firm that supplies robots to the clients. Each team comprised of 5—6 members and was to run this business over 10 quarters. Each member was assigned a role like CEO, Marketing Head, Finance Head, Research & Development Head, Production Head, HR head and they had to take decisions to successfully run their business across the American, Asian and Latin American markets. Their performance was reviewed by the instructor at the end of the first year and each team was told about where their company was and where it was moving to. The debriefing allowed students to get an idea of how aligned the firms were to the original strategy designed by them and their future course of action to ensure a profitable firm with a good market share. The response rate for this survey was 36.5% and after cleaning and editing of data the final sample size was 142.

The research framework developed is presented in Fig. 1. The process was measured by 9 items of the Learning Process, 5 items of Team Dynamics and 7 items of Instructor Role. Simulation as a pedagogical tool leads to perceived effective learning which is influenced by the learning process, team dynamics and the instructor’s role. The learning process is the design and structure of the simulation case study. Team dynamics is defined as the ability of the students to work in teams as they are operating as firms in the market. Instructor’s role is to facilitate students, provide feedback on their strategy and move, motivate them to behave as per their roles, evaluate and engage them. The perceived effective learning was captured by 8 items of Integrated Learning and 5 items of Decision Making (see Appendix A). Integrated learning is the ability to put together the relevant theoretical concepts studied over the year for processing various business situations. Decision making included the perception of components related to making decisions in business circumstances. The framework suggests that the learning process, team dynamics and Instructor’s role plays a crucial part in integrated learning and decision making. The initial three dimensions were treated as the independent variables having an impact on perceived effective learning (dependent variable) comprising of the latter two dimensions. The three demographic variables were also considered as independent variables having an influence on perceived effective learning.

The content validity of the scales was verified with instructors and trainers conducting various simulation exercises for business schools and corporate houses. A pre-testing of the questionnaire with 30 participants helped in assessing the reliability of the scales which was statistically tested using internal consistency method. The Chronbach alpha scores for the total scale and the five dimensions are presented below.

4. Results

The sample consisted of 110 male and 32 female respondents. The average age of the group was 24.7 and work experience was around 25 months. The influence of the three demographic variables was tested using One-way ANOVA and bivariate correlation. The ANOVA results showed that there was no significant impact of gender on any of the variables representing integrated learning and decision making. The correlation between age and work experience with effective learning also did not yield any significant results with only two variables showing very weak correlation.

The next step in the analysis was to perform a linear regression of the independent variables (Learning Process, Team Dynamics and Instructor’s Role) on the dependent variables (Integrated Learning and Decision Making). The summary of the outputs is presented in Tables 1 and 2.

The results showed that regression equations for the independent variables (three dimensions) on the dependent variables corresponding to the two dimensions were significant (Tables 1 and 2). The F values for all the independent equations were significant at 0.05 level of significance. The R square and the adjusted R square values showed modest levels explaining the variance in dependent variables. The multicollinearity was absent as the Variance Inflation Factor for the individual
variables were less than 5 in all the regression equations. Only the significance of learning process, instructor’s role and team dynamics on integrated learning.

### Table 1

<table>
<thead>
<tr>
<th>Integrated learning</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>V8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning process</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>It made my course more interesting.</td>
<td>0.334**</td>
<td>0.296*</td>
<td></td>
<td>0.263**</td>
<td>0.241*</td>
<td>0.169**</td>
<td>0.264*</td>
<td></td>
</tr>
<tr>
<td>I found it more motivating to learn.</td>
<td>0.203**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The simulation exercise was purely about number crunching.</td>
<td></td>
<td>-0.157*</td>
<td></td>
<td></td>
<td>-0.142*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I learnt a great deal from the decision making process.</td>
<td>0.220**</td>
<td>0.428**</td>
<td>0.504**</td>
<td>0.240*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team dynamics</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The exercise helped me build up team skills.</td>
<td>0.435**</td>
<td>0.297**</td>
<td>0.232*</td>
<td>0.355**</td>
<td>0.245*</td>
<td>0.277**</td>
<td>0.251**</td>
<td></td>
</tr>
<tr>
<td>My team was able to master the mechanics of simulation so that we could focus on the required decision for each round.</td>
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<td></td>
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<tr>
<td>Instructor’s role</td>
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<td></td>
</tr>
<tr>
<td>My instructor positively evaluated my team’s work.</td>
<td>0.273**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My instructor was able to give me the feel of a real life CEO.</td>
<td></td>
<td>0.239*</td>
<td></td>
<td></td>
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</tbody>
</table>
| *0.05 Level of significance; **0.01 level of significance. Variables V1–V8 refer to the variables under integrated learning, see Appendix A.

It is seen that if learning process in the simulation case study is purely about number crunching, it negatively affects the Integrated Learning process in terms of understanding the practical integration of business functions and understanding the industry dynamics of business. Similarly if the learning process is too engaging or the instructor evaluates the team’s work positively, it negatively impacts the student’s ability to design an optimum configuration of product mix for the target customer. Another negative relationship found was that when the instructor is able to make a student feel like a real life CEO, it could lead to him/her digressing from the initial mission/vision they set for their business.

The influence of the instructor’s role seems to be minimal on integrated learning in comparison to learning process and team dynamics. The results very clearly demonstrate that if the course is interesting and development of team skills leads to positive perception of integrated learning. In the case of decision making skills all the three dimensions had more or less similar impact. If the participants perceive he/she is involved more in decision making components of the simulations it is strongly influencing the perceived effective learning. When the exercise helps student build up team skills, his/her perceived effective learning is higher. Besides, if the team is able to master the mechanics of simulation so as to focus on the required decision for each round, the students’ perception of the simulation helping in effectively meeting the course objective is also positive. It also leads him to believe that the exercise helped him/her develop and analyze competitive advantage for his/her business and that he/she could clearly understand the industry dynamics of his/her business.

When the instructor positively evaluates teamwork and makes the student feel like a real life CEO, it enhances perceived effective learning. If the student is motivated to learn, the simulation exercise helps him/her develop better analytical skills as also a better understanding of the target market. Moreover if the student perceives that he/she learnt a great deal from the decision making process during simulation, it leads him/her to believe that he/she has developed analytical ability, analyzed the competitive advantage for his/her business, felt doing business in real world scenario and understood clearly about his/her target market. From the results it is obvious that the involvement with decision making process has positively influenced the effective learning through decision making skills.

### 5. Discussion

Among the three dimensions influencing perceived effective learning — team dynamics has emerged as the most important dimension followed by instructor’s role and learning process. The demographic variables i.e. age, gender and work experience, did not exhibit any influence on the dependent variables. This could be primarily because of the sample being homogenous in composition. Data were collected from the students of a b-school pursuing their first year of Masters in Business Administration (MBA). The study by Gosenpud (1987) suggested a positive correlation between simulation performance and students’ desire and interest in participating; our study too proved that such a relationship exists albeit of a weaker nature. This indicates that students are willing to learn through simulations but what kind of concepts should be taught through simulation is not clear.

Our study also supports the findings of Wolfe and Box (1987) that there is no relationship between the amount of time spent in making decisions and performance. Moreover, our study also supports the findings of Poisson-de Haro and Turgut (2012) that during the simulation exercise, students can attain excellent performance regardless of learning crucial skills of managing a firm; however, this relationship is very weak. This shows that if learning process in the simulation case study is purely about number crunching, it negatively affects the integrated learning process in terms of understanding the practical integration of business functions and understanding the industry dynamics of business. This could imply that the simulation
Variables V9–V13 refer to the variables under decision making, see Appendix A.

Table 2
Influence of learning process, instructor’s role, and team dynamics on decision making skills.

<table>
<thead>
<tr>
<th>Decision making</th>
<th>V9</th>
<th>V10</th>
<th>V11</th>
<th>V12</th>
<th>V13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It made my course more interesting.</td>
<td>0.307**</td>
<td>0.249*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I found it more engaging.</td>
<td></td>
<td></td>
<td>0.463*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I learnt a great deal from the decision making process.</td>
<td>0.284*</td>
<td>0.313**</td>
<td>0.419**</td>
<td>0.293*</td>
<td></td>
</tr>
<tr>
<td>It provided me a valuable learning experience.</td>
<td></td>
<td></td>
<td></td>
<td>0.285*</td>
<td>0.395**</td>
</tr>
<tr>
<td>Team dynamics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The exercise helped me build up team skills.</td>
<td>0.375**</td>
<td>0.251**</td>
<td></td>
<td></td>
<td>0.298**</td>
</tr>
<tr>
<td>Instructor’s role</td>
<td></td>
<td></td>
<td></td>
<td>0.426**</td>
<td></td>
</tr>
<tr>
<td>My instructor positively evaluated my team’s work.</td>
<td></td>
<td></td>
<td></td>
<td>0.209*</td>
<td></td>
</tr>
<tr>
<td>My instructor was able to give me the feel of a real life CEO.</td>
<td>0.194*</td>
<td>0.239**</td>
<td>0.316*</td>
<td></td>
<td>0.292**</td>
</tr>
</tbody>
</table>

*0.05 Level of significance; **0.01 level of significance.

is tilting toward becoming a number game. In addition students are seen to be operating by observing patterns and achieving results. This could unintentionally be motivating ‘hit and trial’ method with no structured learning.

In a simulation exercise, the feedback provided by the instructor positively influences the experiential learning among the students as suggested by Thompson et al. (1997). This relationship is also supported in our study. During the simulation exercise, the instructors provided mid-course review (i.e. feedback) to the teams on their performance in the first four quarters. The teams showed considerable improvement in their business review after this feedback session. Debriefing from the instructors is also considered to be critical to the learning experience as suggested by Cadotte (1995). Surprisingly, we did not discover any relationship between the two. Probably, the nature, type and timing of debriefing sessions could be explored in future studies to understand this anomaly. Our results also show that if the learning process is too engaging or the instructor evaluates the team’s work positively, it negatively impacts the students’ ability to design an optimal configuration of product mix for the target customers. This is an interesting finding and questions the effectiveness of simulation in developing sustained learning among all students. The simulation in our study was offered as a workshop for 3 days by an external agency. Being delivered in workshop mode through a hands-on approach by the facilitator; students find it engaging and fun, but it also led to students not giving enough time to designing solutions (i.e. marketing mix). This raises an interesting question that whether simulation is all about instant gratification. After all, one of the objectives of case study pedagogy is to ensure sustainable learning which a student is able to leverage throughout his/her decision making. However, in this case, simulations seem to be inducing a thrill among the students’ but not sustainable learning.

An interesting finding of our study is that the instructor’s ability to give a feel of a ‘real life CEO’ had a positive influence on perceived effective learning. This is an important contribution since earlier studies (Knotts & Keys, 1997; Wolfe, 1997) have stressed the fact that there are hardly any studies which talk about the factors chosen by instructors to enhance the effectiveness of simulations. The simulation exercise was designed in such a manner that each team was required to select a student amongst it, who would be acting as the CEO for the first four quarters. For the next four quarters, the CEO role would move from this team member to another. During the mid-course review, the CEO made the presentation along with his/her team members about the progress made so far, challenges faced by him/her, and what corrective course of action, he/she would like to suggest to his/her successor in future. The students indicated that they felt more responsible for their decisions during this exercise. However, our study also found that instructor’s ability to make a student feel like a real life CEO, digresses him/her from initial mission/vision that his/her team set for their business. This questions the premise of learning becoming effective when it is fun. Though the perceived effective learning is high when he/she is positively evaluated but the ‘feel like CEO’s’ tends to deviate and causes his/her digression from the initial mission/vision. Is this because the CEO is too busy trying to take the team along and deliver results within time? Or is it because the simulation fails to impart another important learning of taking decisions which are in sync with one’s vision/mission and strategy? This again prompts us to compare the effectiveness of case study vis-à-vis simulations; and also the nature in which these are imparted i.e. in a workshop mode (stand-alone) versus when integrated in a strategic management course.

Gosenpud (1987) had also studied the effect of team cohesiveness on simulation performance and found a positive relationship. This relationship has also been proved by our study. But it fails to capture the impact on developing the decision making skills in a student. On the other hand, Coffey and Anderson (2006) suggested that the relationship between cohesiveness and students’ perception of the educational value of simulation experience is not clear. Interestingly, this study proves that cohesiveness has a positive relationship with perceived effective learning; though it has more effect on integrated learning than on decision making. The reason for this could be the fact that students are undergoing simulation toward the end of their first year management program. During their two year program, they are randomly divided into groups of 6 students each. The groups are supposed to be as heterogenous as possible. As the ‘learning to work in a group’ has set in all
individuals by this time and therefore whenever they are required to work in teams, they find no difficulty in assigning responsibilities to each other and contributing to the task. However, whether this cohesiveness results in effective decision making is not known with certainty. This is already seen earlier in 2 instances wherein a). Team is not able to design an optimal mix, and b). CEO is digressing from originally formulated vision/mission. Nevertheless, this study showed up two interesting results: a) students’ perceive that their decision making has improved by undergoing simulations exercise, and b) students’ value courses that are interestingly designed.

6. Conclusion

Broadly the important factors covered in simulation process can be classified as learning process, team dynamics and instructors role. As real effective learning can be studied only through longitudinal studies, the present cross sectional study uses perceived effective learning which constitutes of integrated learning and decision making. The research framework also included demographic variables which did not have any impact on perceived learning. The demographic variables might have an impact on perceived effective learning if a study is conducted on multiple samples which vary significantly in terms of age, gender and work experience.

It is interesting to note that team dynamics rather than the learning process has emerged as the most important dimension. This leaves academicians and professionals from this field to consider if simulation is actually leading to the development of ‘managing people skills’ rather than students learning specific concepts. The building of individual confidence is the most important variable in decision making skills which is followed by coping with uncertainty and evaluating risks in real market situation. It was found that the perceived effective learning increases when the course content is interesting and participants are more engaged in decision making sessions during the simulation exercise (Wolfe & Rogé, 1997). Instructors have an ability to influence perceived effective learning by adopting techniques like inducing the students to take their roles seriously. Team dynamics, particularly development of team skills has emerged as an important element positively affecting perceived effective learning; however certain other variables like team size and team constitution can be studied in greater detail (Kayes, Kayes, & Kolb, 2005).

The study successfully establishes cohesiveness to have a positive relationship with perceived effective learning but fails to capture the impact on developing the decision making skill of an individual student. However, the study does not capture the student’s personal learning styles i.e. the individual styles of learning of a student which varies from individual to individual (Robotham, 1995). This aspect can be looked at in another study where the differential impact of simulation on different individuals based on their learning styles can be analyzed.

The study shows that the influence of instructor’s role is minimal on integrated learning in comparison to learning process and team dynamics. It is also seen that the instructor’s effort to make the student feel like a CEO has a negative impact on the team’s ability to remain focused. It can thus be hypothesized that having a detailed manual in place of an instructor can keep the teams more focused thereby improving the learning (Gonen, Brill, & Frank, 2009).

The study further has scope for comparing across courses in marketing, finance, operations and human resource management as the objective of these courses is to provide functional domain knowledge. In these courses, simulation would be restricted to implementation of single domain knowledge rather than integrating cross functional domain knowledge as in case of strategy. However, the assumption of the authors can be viewed differently by others.

It will also be interesting to track real effective learning that is how much of learning is retained and applied by students two years later in their jobs. Companies, these days are using a lot of simulation to aid employees to understand situations (Olivia & Bean, 2008; Trefry, Woodilla, & Gumbus, 2006). Another premise that can be tested later is the effectiveness of simulation as pedagogy in a B-School versus on-job training.

The influence of team size on the simulation performance has not been evaluated here as it would involve study of multiple sub samples to estimate this relationship. In addition, the authors have not studied the dimension of decision making from an ethical perspective and its consequences in perceived learning (Hunt & Jennings, 1997). Both these areas can be considered as future directions for research.

Appendix A. Simulation process: dimensions and variables used in the research framework

Learning process (alpha = 0.8276)

I found the exercise fun.
I was reacting to numbers on the screen.
It made my course more interesting.
I found it more motivating to learn.
I found it more engaging.
Time bound decision making killed creativity.
The simulation exercise was purely about number crunching.
I learnt a great deal from the decision making process.
It provided me a valuable learning experience.
Team dynamics (alpha = 0.8176):

The exercise helped me build up team skills.  
My team had very strong leadership.  
My views and opinions were taken into consideration by my team mates.  
My team was able to master the mechanics of simulation so that we could focus on the required decision for each round.  
My team members positively evaluated my contribution.

Instructor role (alpha = 0.8587):

Learning happened mostly through the debriefing session.  
The instructor was thoroughly familiar with the subject matter of simulation.  
The instructor was helpful when students had difficulty with the simulation.  
The instructor generated interest and motivated students to participate in the simulation.  
The instructor clearly communicated the expectations associated with the simulation experience.  
My instructor positively evaluated my team’s work.  
My instructor was able to give me the feel of a real life CEO.

Perceived effective learning

Integrated learning (alpha = 0.8746)

| V1 | The exercise helped me develop analytical skills. |
| V2 | It helped me in applying what was learnt in the course. |
| V3 | It helped understand the practical integration of business functions. |
| V4 | This exercise helped me develop and analyze competitive advantage for my business. |
| V5 | I could clearly understand the industry dynamics and the competitive position of my business. |
| V6 | It is an accurate representation of how businesses work in the real world. |
| V7 | It gave me a thorough understanding of the target market. |

Decision making (alpha = 0.5785)

| V9 | It enabled me to cope with ambiguity and uncertainty in business decisions. |
| V10 | It gave me an opportunity to evaluate the risks associated with a real market. |
| V11 | While running the simulation, I digressed from the initial mission/vision I had set for my business. |
| V12 | It built my confidence in my own business decision making. |
| V13 | Simulation helped me design an optimum configuration of product mix for my target customers. |

References


