Concise paper

Simulations in teaching systems analysis case studies: a method described

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ABSTRACT

The teaching methodology of simulations, which makes use of persons to play roles, has found application in education and some applied human sciences such as law (Morgan, 2002). However, little evidence exists that this methodology has been significantly applied to the teaching of case studies in systems analysis (SA). This paper discusses a study which used action research to evaluate the use of simulations in teaching two case studies to final year students in our Bachelor of Applied Information Systems degree. The success of the method was demonstrated using anonymous student evaluations, and evaluations of the consequent systems analyses produced for each of the case studies. A DVD of the process was made to make future peer assessment possible.

Keywords

Simulations, action research, systems analysis, cognitive styles.

1. INTRODUCTION

Traditionally teachers of SA have prescribed case-studies, some of which are long and protracted. The weakness of this approach is that the case study is non-living. Exercises in the reading of body language, expressions of attitude and even further detail about what users think they want, are denied.

The first half of our third-year paper in Systems Analysis is theoretical and focuses on IS management and professionalism. For the second half of the paper, and to test how well the students put their theoretical knowledge into practice, the class is divided into two simulated 'IS teams'. Each team has to produce a full SA as a group effort. The members of the team are exposed to the content of the team's case study by way of simulated interviews. In these, the tutor plays the roles of the users.

Our research aimed to evaluate this process of simulation. The results, as measured by way of anonymous student evaluations and the evaluation of the deliverables, were extremely positive.

2. SUMMARY OF PRIOR RESEACH

2.1 Simulations in Education

Fischer (in Hopkins , 2002), notes the affective outlet in which students' feelings are aroused to stimulated learning. Morgan (2002) describes the process of group simulation. Without prop or costume, he explains, a group of students is encouraged to simulate some activity. A class is asked to pretend to be something they are not and act as they believe the group would act.

2.1.2 Advantages of Simulations in Education

Morgan (2002) enumerates the advantages of simulations as follows:

1. When properly conducted, real and experiential learning will occur.
2. Simulations are "hands-on" so that students become participants.
3. Simulations are motivators. Student involvement in the activity develops interest.
4. Since simulations are designed, they can take into consideration developmental age requirements.
5. Simulations are inspirational. Student input is welcome and activities are designed to encourage students to enhance the activity through their own ideas.

6. Simulations are developmentally valid. Simulations take into account the developmental level of the students.

7. Simulations are empowering. Students take on responsible roles, find ways to succeed, and develop problem- solving tools as a result of the activity. (Morgan, 2002)

2.1.3 An Anomalous Lack of Simulations in Systems Analysis Courses

Despite the advantages discussed above, we were unable to show that such methods had been significantly introduced into the teaching of SA. We searched the web for SA courses and found well over a thousand advertisements and course outlines. We then studied the first hundred which were from credible tertiary institutions in as much detail as was available. On this instance, we found no evidence that simulations formed a significant part of any of these courses. After several further attempts, we found four courses world-wide in which students and tutors acted the roles of users and developers in the way we had done for this study.

3. THE DEVELOPMENT OF RESEARCH QUESTIONS

3.1 Objectives of the Study

The objectives of this study were to:

1.examine the simulation methodology critically for the teaching of SA case studies; and

2. to document our study by way of a DVD and hence make possible future peer assessment.

The research questions we posed were:

1) Do students find case studies taught by simulations to be positive and motivating? and

2) Are the output deliverables of adequate quality?

3.2 Action Research

The nature of case study simulations and the way they need to be observed suggests participative research, known as "action research" (Tothunter, 2001). Mackay's (2004) evaluation of an e-learning component in a nurse training programme showed the use of participant interaction and feedback as a viable measure of the component's success. A similar research methodology was thus used in this study.

4. RESEARCH PROCEDURE

As discussed above, our twelve students first spent a term studying theory on the management of IS department and teams. Thereafter, we divided them into two groups of six, care being taken to make them of balanced abilities. We then presented each group with a memorandum introducing a systems problem. The characters in these organisations were all simulated and could be interviewed by appointment. Students were also required to hold proper meetings (rules of order required), most of them observed by the tutor and the other team. Each team was encouraged to critique the other team's handling of various situations.

4.1 Case studies

The case studies were based on real scenarios, modified where necessary to illustrate issues highlighted in key IS literature. For example, Markus (1983), identifies organisational power, giving some individuals political advantage over others, as a key element in system success (or otherwise). We thus modified the real scenarios where necessary to ensure a level of conflict. The two case study memoranda were given to all the students. Which team was assigned to which case study, however, was decided on the flip of a coin. The cases were as follows:

Case 1:

An initial memorandum from REWAREWA AUTO PAINTERS explained that some of their customers were unhappy because of colour-matching issues between the existing and new paintwork. They thought a new computer system could help them. In fact, the problem boiled down to poor leadership, resulting in lack of control of staff with various political agendas.

Case 2:

A brief from LINDENS SUPERMARKET identified staff dissatisfaction with their shift allocation system as troublesome and resulting in high staff turnover and absenteeism. Both political agendas and failure to exercise proper controls were in fact the root causes of these problems.

Table 1: Student responses to the first seven items on the research instrument, expressed as frequencies (out of twelve) and as relative frequencies (in brackets).

The simulation method:	(1) Strongly agree	(2) Agree	(3) Neutral	(4) Disagree	(5) Strongly disagree
Gave me an opportunity for real, experiential learning.	7 (58%)	5 (42%)			
Was sufficiently "hands on" for me to feel that I was a participant in a real process.	6 (50%)	3 (25%)	3 (25%)		
Increased my interest in the case study.	8 (67%)	4 (33%)			
Was too juvenile an exercise for me.			1 (8%)	4 (33%)	7 (58%)
Gave me the opportunity to make on-going input.	3 (25%)	7 (58%)	1 (8%)	1 (8%)	
Resulted in trivial material.			1 (8%)	7 (58%)	4 (33%)
Helped my problem-solving abilities to improve.	5 (42%)	4 (33%)	2 (17%)	1 (8%)	

4.3 Development of a Research Instrument

We took Morgan's (2002) list of advantages (see Section 2.1.2) and used this as the basis for our instrument. These were reduced to seven items rateable with a four-point Lickert scale, as follows:

(1) Strongly agree (2) Agree (3) Disagree (4) Strongly disagree

An open-ended section followed, where students were invited to add comments of their own. We conducted a pilot study using eight students. After this, we slightly rephrased some of our items for clarity and increased our Lickert scales to six-points, thus:

(1) Strongly agree (2) Agree (3) Don't agree or disagree (4) Disagree (5) Strongly disagree

(6) No opinion.

For the structured items in the final instrument, see Table 1.

The two unstructured sections started respectively with the directions:

Please list any other advantages of this approach, which may occur to you:

and:

Please list any other disadvantages of this approach, which may occur to you:

5. RESULTS

The results were based on responses using the above instrument, from our class of twelve students. It was emphasised that confidentiality would be guaranteed.

5.1 The Instrument's Seven Structured Items

To the seven items, the students responded as shown in Table 1.

To observe how closely the group of student responses corroborated Morgan's list of advantages, one should note that of the 84 responses, 74 (some 88%) showed agreement or strong agreement. Morgan's (2002) advantages were thus generally corroborated by this study.

5.2 Student Opinions

The following is a summary of these:

Positive comments summarised:

1. It gave an in-depth view of interviewing, problem-solving, and working in teams.

2. It seriously puts your skills to the test and definitely provides a look at a real-life situation. Theory does not do this or prepare one adequately. It has turned out better than I thought.

3. This is discovery learning. It is up to the learner to uncover the information and determine the facts.

4. The process is dynamic and flowing. It encourages better time-management than a long, theoretical case study might.

5. It feels like real-time (hands-on) learning, which will be applicable later on in the real world.

6. It gives a good incentive to work together as a team.

Negative comments summarised:

1. Roles are sometimes overplayed.

2. Not all tutors (this one excluded) have sufficient industry experience to act the parts.

3. I did not like interviewing some difficult characters in the scenario. This may have added to the realism, but at times it left me as stressed as I would have been in the real situation.

Other comments summarised:

1. Students need to be advanced and mature.

2. Students should be cohesive and comfortable with each other.

The six positive comments made not only further corroborate Morgan's (2002) advantages of simulations, but indicate a level of enthusiasm not necessarily present in more conventional approaches to teaching SA. Of the negative comments, the first is a negative criticism of the way in which the simulation was carried out, not of the method itself. The second advocates that tutors will only be effective if they have industry experience; a difficult point to refute without further research. The third, though obviously an expression of anxiety, can be taken as a positive for the realism of the process.

The last two comments appear to come from a respondent interested in the future success of the technique, prepared to put effort into making recommendations for the future. In short, these eleven comments serve to confirm that the use of simulations in teaching these case studies were a success, notwithstanding some minor failings in the way it was carried out.

5.3 The Delivered Output

The systems analysis reports produced by the teams were of an exceptional quality, each achieving a mark close to 100%. Their standard was corroborated by an independent colleague who is a qualified and experienced systems analyst. This study thus found that when taught by simulations, SA case studies become a positive experience for students and staff.

6. CONCLUSION

We believe that our study demonstrated the effectiveness of simulated case studies in SA as a fulfilling alternative to more conventional methods. We also found this method to be efficient, having few overheads other than the preparation of the cases. Sources of case studies are easily taken from one's real life experiences, although we recommend:

1) that names and places be changed to protect the privacy of the actual participants; and

2) that conflict situations be enhanced where possible to simulate the dangers of system development in a safe environment.

The hope is to distribute our DVD as widely as possible, and hence to collect the views of peers over the next year. This will enable some refinement of the procedure.

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