

# Simulating the Process of Troubleshooting IT Problems in a Computerized University Laboratory

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**Abstract**— Among many available advanced teaching techniques implemented nowadays by scholars worldwide simulation is of particular interest. It goes without saying that recreating a professional situation that specialists-to-be are likely to find themselves in and thus face the possible challenges it may pose greatly increases their chance of handling it successfully, i.e. to their advantage. This paper shows how in the environment of a computerized university laboratory the target learners are conditioned to cope with some topical IT-related issues, such as locating a certain folder and removing an unsolicited malfunctioning application. The findings of this experiment are then thoroughly reviewed and generalized.

**Keywords**— *simulation; role-play; simulation-based teaching/learning; computerized laboratory; IT-related issues*

## I. INTRODUCTION

The goal of learning design is to help create educational settings and sessions that are learner and activity centered. Authentic learning activities can better engage learners. Role playing is an interesting example of an active learning and teaching strategy. It can incorporate simulations, games and demonstrations of real life cases related to any topic. The strategy has been applied recently (from 2013 through 2015) in one of New Zealand institutions in a systems analysis and design course within the computing and information technology Bachelor's degree program. Learning design plans were prepared with the expectations that the role play activities would contribute positively to this course.

According to researchers simulation and role-playing are among the activities that can promote and enhance the student's speaking skills. The study we have conducted also supports their hypothesis, which states that simulation and role-playing enhance the students speaking skills and provide advantages for them of using those activities that can be explored in other researches. Students expose to communication practices the same as they face in the real-life situations and they enjoy the activity in the classroom.

Vocabulary is considered to be the key element of students' understanding and successful communication. Everybody knows that without understanding vocabulary no comprehension is possible either in native language or in a foreign one. In this case role-play is a good strategy to help students be adapted to a new social environment. Role-play potentially offers an enjoyable way for students to encourage

them to use vocabulary appropriately in simulated authentic situations. "Role plays early in the course can expose students to different situations they are likely to face in their future career" [1].

We also must stress that role-play in science lessons is often underrated and underused often because of misconceptions about what role-play is and how it can be put to use in science education.

The Concise Oxford English Dictionary (1987 edition) definition of role-playing is as "behaving in accordance with specified function." This is accurate but a working definition of role play is more difficult because it is associated with "dramatic" activity in the minds of teachers and also because of confusion in the literature arising from its relatedness to play, games and simulation [2]. In science education, role-play may be seen as an interaction between these three components – either in combination or by themselves. Role-play is the medium of interactive/experiential learning. So, the value of games, simulations and the techniques related in the language-teacher's repertory are receiving a renewed attention. The value of such techniques in teaching process is obvious for communicative competence.

By the way, the terms 'simulation', 'role-play' and 'role-simulation' have been variously interpreted in different textbooks and English language teaching literature; the English Language Teaching Institute [3] has drawn up its own definitions for design and pedagogical purposes. A simulation is an activity in which students discuss a problem, which is in a setting that has been clearly described to them. The students apply their own-country experience to this information, thus giving them the basic data to discuss the problem. A simulation is a representation, which employs substitute elements to replace real or hypothetical components, and as such it has much to offer the language teacher working in the unreal situation of the classroom. In a language learning situation the 'substitute elements' can be any facet of the information given to students, the problem itself or the experience and attitudes of the participants themselves. The language learner reacts to the task or problem and acts within the constraints of the environment given in the simulation. The closer the simulation can be to reality and to the student's own first language role or new foreign language role, the closer the language that they produce will be to that which they will need to produce in the real situation.

Most teachers are familiar with role-plays and simulations share a lot in common with this technique. A simulation can contain either role-play or role-simulation. Role-play however can stand alone in its own right as a language learning activity. It involves the student taking the part of different characters, for example a trainee, a machine operator, or a database expert roles which might be similar to, or very far removed from, their own personal experience. There is a wide variety of approaches to role-play: the student can play their part in a highly controlled language situation, perhaps working from a script, or the language can be semi-scripted for them, or again they can be free to improvise his part from a given scenario. The student can be provided with their own role-card, which tells them what their role character, and attitudes are, and which can give them linguistic support by suggesting what they might say and how they might say it. Outside a simulation, role-play usually involves a finite interaction between characters rather than the resolution of a problem. It provides opportunities for detailed work on pronunciation and intonation, as well as syntax, and a possibility to use drama in the foreign language classroom.

In role-simulation, on the other hand, the student is himself/herself, and reacts to the simulated task on the basis of their own personal or professional experience. They no role imposed on them from outside in the form of a role-card or a prepared part to play and the implication of this is that an engineer, for example, would be an engineer and a system administrator would be a system administrator in the simulation. They would apply their own personal experience and professional knowledge to the problem-solving activity. The student in this way is transferring their own-country and first language experience to the simulated foreign language situation.

In other words, both are interactive learning events but generally role-plays involve learners taking the part of characters which can be unrelated to them while participants in a simulation are more inclined to behave as themselves. It is highly likely that they therefore apply their own background and native language experiences to a situation. In addition, role-plays are commonly carried out to hone particular language functions in a highly supervised context and are somewhat simple and short. Simulations, on the other hand, provide quite more realistic scenarios for more extensive interaction which allows for more personal engagement of students.

Simulation is a technique for practice and learning that can be applied to many different disciplines. It replaces and enhances real experiences with mildly guided ones, frequently characterized as ‘immersive’, that evoke or replicate topical aspects of the real world in a fully interactive fashion as it has already been noted. Simulation-based learning can be the way to develop IT professionals’ language knowledge, skills, and attitudes, whilst sparing them the nuisance of dealing with technology in a foreign language. Simulation-based training techniques, tools, and strategies can be applied in designing structured learning experiences, as well as be used as a measurement tool connected with targeted teamwork

competences defined by learning objectives. In specialized language training (e.g. developing IT specialists’-to-be language competences in information technology), simulation offers good scope for designing realistic scenarios and employing modern equipment, which provides for retraining and practice until one can master the necessary competences.

Simulation-based learning is becoming increasingly popular with educational institutions as a method of inquiry into science-related problems [4,5]. Furthermore, several research studies have discussed the drawbacks of traditional lecture-oriented and case-study-based pedagogical or training approaches [6-9]. Consequently, teamwork training carried out in the simulated environment may offer an additional benefit to the traditional didactic instruction, improve performance, and possibly also help minimize errors.

The theoretical basis underlying the use of role-play in vocational training is that students (similar to pupils in science role-plays) happen to be mentally (emotionally) and intellectually engaged in their lessons, which allows them to express themselves in an academic or professional context and grasp complex concepts of their training [2].

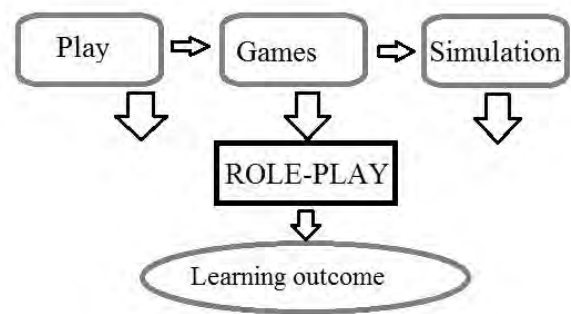


Figure 1: Role-play as the medium of interactive/experiential learning

This is also evidenced by the contemporary literature on theories of language acquisition which hypothesizes that simulations and games are beneficial methods for helping learners acquire another language [10-14]. Simulation-based language education for specific purposes (here English for information technology) can be a platform which presents valuable opportunities [15] to resolve practical issues most learners encounter:

- Inability to comprehend basic technical and technological concepts;
- Meeting essential language requirements for an efficient performance at work;
- Failure to foresee unexpected outcomes whilst dealing with an issue.

The above-mentioned benefits of the technique in question as well as various gamification methods [14,15] deemed to be especially successful and convenient for students training, in particular, in Management Information Systems encouraged the authors to test it out although due the testees’ average level some role-play elements were also incorporated in the experiment.

**II. METHODOLOGY**

The methodology of this paper was proven feasible and eventually bore fruit thanks to a number of prerequisites:

- Adaptability and user-friendly format of one of the course books [18-22] which was selected by the authors to complement the university English course syllabus;
- Suitable facilities available to accomplish an experiment, i.e. a fully computerized language laboratory;
- Learners' academic background and language skills which were deemed sufficient for them to participate in the experiment.

Initially, a placement test was taken by freshmen majoring either in business informatics or information technology (i.e. GIBO-2-16 and IVBO-08-16) who were later assigned to one of the target subgroups. This allowed for the desirable homogeneity in terms of linguistic skills. That is to say, each of the learners qualified to take part in the experiment. As a result, their average level was determined as pre-intermediate (still not quite independent speakers). Altogether there were fourteen learners in each subgroup.

Secondly, both the up-to-date software installed on the computers in the laboratory and the upgraded hardware facilitated the procedure of conducting the experiment as well.

Finally, the coursebook forming part of the series 'English for Information Technology' was pre-selected since it combines a strong grammar syllabus with the specialist vocabulary students need to succeed in this area. It also contains topics that reflect the latest developments in the field making it immediately relevant to students' needs. The CD-ROM accompanying the book was used to enhance the desirable effect of the experiment and interactive glossaries contributed to a quicker vocational vocabulary buildup. As far as the main task was concerned, it presented the learners with a few ready-to-use suggestions (clues). These were presented as series of step-by-step instructions aimed at helping resolve IT-related issues of a different nature. They were meticulously reviewed and elaborated to ensure that they were both educative and engaging enough. In order to stimulate learners' cognitive processes and render each situation more challenging some intermediate steps were blanked out. The learners were supposed to accomplish the task by working in pairs, one of the partners being an IT help desk technician while the other an IT user. In an attempt to eliminate any feeling of possible anxiety or insecurity imposed by the formality of the given situation it was suggested the students firstly followed an example conversation. This was preceded by prompts meant to guide the students through the conversation (at this stage there were no 'missing' steps):

'Start' button → 'Control Panel' → 'System and Security' heading → under 'System': 'View amount of RAM and processor speed'.

Finally, they saw the actual conversation:

A: First, could you click on the 'Start' button?

B: Sure.

A: Then select 'Control Panel'. A box will appear.

B: OK, I got it.

A: Click where it says 'System and Security, after that 'View amount of RAM and processor speed', under 'System'.

B: Done! Thanks very much!

A fragment of the activity which the learners had to handle at the beginning of the experiment is shown below:

...  
2. right-click on 'c:' drive → 'Properties' → ... → 'Advanced Sharing' → 'Share this folder' check box → 'OK' → 'Close'

3. press 'Start' key and 'E' key to open Windows Explorer → 'Uninstall or change a program' at top → ... → right-click → select 'Uninstall'

The problem the learners confront in the second situation is about the IT user being unable to locate a certain folder which one of the users operating this computer does not share. The missing intermediate step is 'Sharing' tab.

In the third situation the IT user tries to rid of a faulty application called 'Anki' that slows down the computer system. The blanked out step is 'find 'Anki''.

**III. RESULTS AND DISCUSSION**

The findings of the experiment are best summarized in the form of two pie charts demonstrating the percentage of the learners in both subgroups who successfully completed the activity.

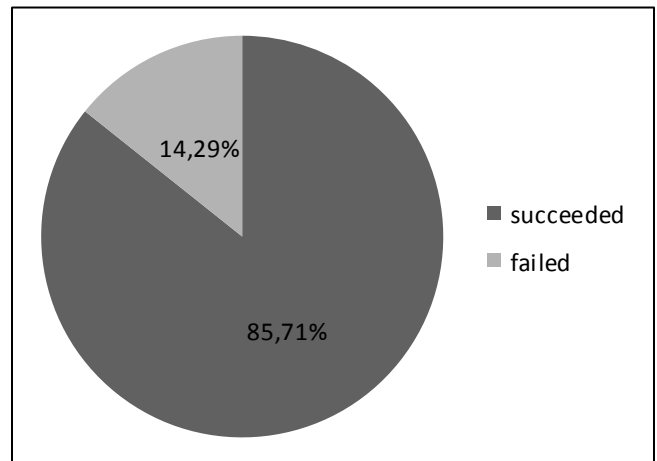


Figure 2. Success rate in IVBO-08-16

Fig.1 clearly illustrates that the overwhelming majority of learners in IVBO-08-16 succeeded in completing the activity. In other words, they managed to resolve the given IT issue by conveying the right ideas to one another and reaching a consensus. 12 learners made up 85.71% whereas only 2 represented 14.29% meaning that 6 out of 7 pairs were able to enjoy success.

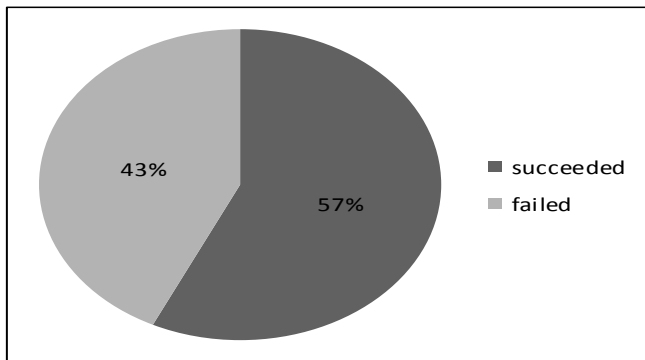


Figure 3. Success rate in GIBO-02-16

Fig. 2 reads that 57% (8 learners) had a fruitful cooperation. However, 43% (equaling 6 learners) experienced a communication breakdown resulting in the problem remaining unsolved. Although the success rate is tangibly lower in this subgroup, the percentage of successful students still comprises more than half of the subgroup.

As regards the main reasons for failure, these were mostly to do not with the learners' poor skills of operating PCs (only 2 learners reported still having trouble understanding basic interface procedures), but with the lack of the essential IT vocabulary required for the activity (6 learners said that they felt they were lacking in it).

#### IV. CONCLUSION

After having scrutinized the findings we were able to draw the following conclusions:

1. Since simulation proved to be an effective technique to design and arrange the selected classroom activity, it was decided to use it for a wider range of activities in order to bring changes to go beyond the conventional routines;

2. Due to the fact that the lack of essential IT vocabulary was recognized as the main obstacle that stopped the learners from attaining the objective of the activity, the authors agreed to pay more attention to building up learners' vocabulary by means of incorporating more relevant tutorials as well as other educational videos in their lessons;

3. The study carried out has been aimed at evaluating the effectiveness of the strategy as well as equipping teachers and other researchers with techniques that help the learners practice new vocabulary to increase their fluency, enjoy their participation in the classroom activities and improve their communicative skills. The findings of the study can become one of the useful references for those who are interested in the problem.

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