

## Evaluation of Role Play as a Teaching Strategy in a Systems Analysis and Design Course

**Emre Erturk**

Eastern Institute of Technology  
Napier, New Zealand

**Abstract.** The goal of learning design is to help create educational settings and sessions that are learner and activity centred. Authentic learning activities can better engage learners. Role playing is an interesting example of an active learning and teaching strategy. It can incorporate drama, simulations, games, and demonstrations of real life cases related to any topic. This strategy has been applied recently (from 2013 through 2015) at the Eastern Institute of Technology (EIT) in New Zealand tertiary, in the systems analysis and design course. It has involved students in the computing and information technology bachelor's degree programme. Learning design plans were prepared with the expectation that role play activities would contribute positively to this course. First, this paper describes how the role play sessions were carried out. Next, the paper discusses the effectiveness of this strategy. This reflection is not only from a pedagogical perspective, but also in terms of its benefits as a useful information technology (IT) analytical practice. Furthermore, the paper presents the findings from this applied and reflective research, along with practical suggestions for teachers interested in practising this approach. An important recommendation is to begin with short role plays and move gradually to longer activities, while giving students advanced notice and time to prepare and become familiar with their roles.

**Keywords:** teaching strategy; information technology education; systems analysis; role play

### **Introduction**

The learning design process, as its name suggests, is about creating an educational setting with sessions that are learner centred (rather than teacher centred). The goal is to implement authentic activities that can engage learners (Reeves, Herrington, & Oliver, 2002). The content and the resources should not be the organizing elements, as they would be for many traditional lectures. Instead, their purpose is to support the learning activities and the students' independent learning. Through the learning design process, teachers can also create a constructive alignment between learning activities, assessments, and learning outcomes (Biggs & Tang, 2011). Good learning design also encourages

important two way feedback between teachers and students through experiential learning and active dialogue (Coffield, 2008). This is also true for role play, which is an active learning and teaching strategy.

Role play typically involves adaptations from real life situations, related to topics being studied. The students demonstrate particular behaviours or performances that show their understanding and competence with a given case and the relevant concepts.

Systems Analysis and Design is a core course for the Information Technology (IT) Bachelor's degree, and helps prepare students for jobs such as IT project manager, business analyst, and systems analyst. Students learn to examine information systems, collect requirements, and design solutions. The course also teaches diagramming for development and documentation. Graduates will collaborate and communicate with various stakeholders during a project within a company, and are expected to bridge the gaps between different groups of people. Role play can be a useful approach to help the students in developing these important communication and collaboration skills.

### **Literature Review**

During the learning design process and in preparation for the lessons, it is important for teachers to consider the numerous factors on which successful student learning depends: for example, needing/wanting, doing, digesting, and feedback (Race, 2010). Therefore, teachers need to organize engaging activities, instead of delivering pure lectures that keep the students in a passive state. Role play, as an active teaching strategy, can incorporate these positive elements of enjoying learning and digesting knowledge, when designed accordingly and implemented successfully.

For teachers who are interested in this strategy, a relatively broad paper written by McSharry and Jones (2000) explains various types of role play with interesting examples from science education and suggestions to consider for all teachers. According to McSharry and Jones (2000), although role play may not be difficult for many learners, it is advisable to start with short role plays and move gradually to longer role plays after both the teachers and the students gain some initial experience and confidence.

The role play activity also should not come immediately before or right after an exam because the exam can cause stress for the students and negatively influence the effectiveness of this activity (Case & Cheek-O'Donnell, 2015). In this course, the activity was appropriately timed so that it did not conflict and did not become affected by an exam or another critical event.

Furthermore, a small number of teachers have recently started using role play in systems analysis and design courses, in particular. In a broader context, Green and Blaszczyński (2012) suggested that role play is suited for teaching soft (personal and social) skills to students and professionals.

The systems analysis and design course itself offers many opportunities for role play. The obvious scenarios include client interviews, proposal presentations, and team meetings. However, this paper is about a more novel, original and recent role play approach: using analytical IT diagrams as scenarios or scripts for the role play sessions.

For example, in 2011, Costain and McKenna from the University of Auckland in New Zealand reported on their implementation of a role play activity coupled with Use Case Diagrams, which are part of the Unified Modeling Language (UML). The use case diagram method is so far the most common one in the literature, as opposed to other IT diagrams. This is due to the pictorial and often simpler nature of this specific type of diagram. However, role play should not be limited to use case diagrams.

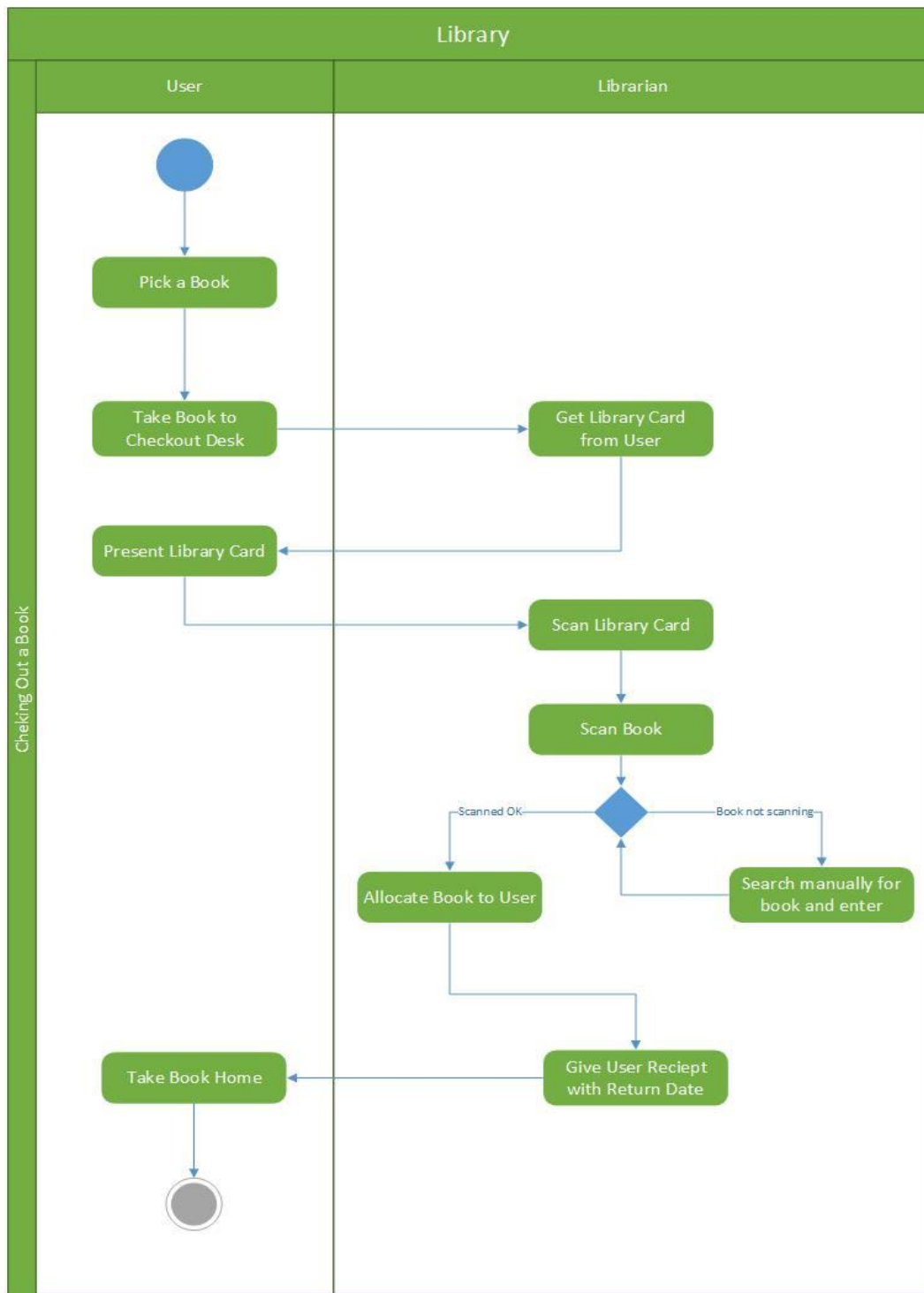
Other examples of IT documentation and diagram artefacts that have been used as a basis for role play by Borstler (2010) at Umea University in Sweden are class-responsibility-collaboration cards and so-called role play diagrams (derived from the UML Class and Object Diagrams).

Choosing which type of diagrams to use is an important and interesting consideration for IT lecturers. Although UML diagrams may often be preferred in industry and IT curricula, students also like Data Flow Diagrams (DFD), which are also still taught in systems analysis and design courses (Millet, 2009). In comparison, DFDs may also provide rich stories and have good role play potential, as they are often less sequential, have a greater scope, and are more open to interpretation. As a process oriented diagram, a similar UML counterpart to the DFD is the UML Activity Diagram.

The role play activity described in this paper was conducted at the Eastern Institute of Technology, New Zealand. Both DFDs and Activity Diagrams have been used to stimulate role play activities among IT students in recent years (from 2013 through 2015) during the systems analysis and design course. The lessons plans were first written for DFDs (as can be seen in the next section); the same instructions were used for role play activities based on Activity Diagrams.

### **Implementation in Courses**

The two class sessions discussed in this paper were on Data Flow Diagrams (DFD) and Activity Diagrams. The first session involved students in using the software in the computer lab. The learning outcome was to demonstrate their analysis of a case by drawing these diagrams. The second session had students reviewing, digesting, and critiquing completed diagrams. Students did this through a role play activity about the library systems and how they function. The learning outcome included explaining the diagram (by acting it out) to others, including non-technical people as well as technical IT staff. It is unnecessary to reproduce all of the diagrams involved in these class activities. One example (a UML Activity Diagram showing just one segment of the library environment) is in Figure 1 below:



**Figure 1: A sample UML Activity Diagram related to a school library.**

From a pedagogical perspective, as can be seen in the learning design plans (Appendix 1), there were three specific teaching approaches that were incorporated. The self-instructions were as follows:

Catering for Learner Needs: It is emphasized (in the beginning of the first session) that diagrams are used in business and systems analysis jobs. This includes reminding students that DFDs and similar diagrams can also be found in other subjects and classes. This increases their awareness of the wider context for this learning topic. The second session is to begin with a picture of a small computer game flowchart, telling the students how modeling and planning are important for creating any kind of software, not just business related software but also games. This helps relate the learning content to something they enjoy in their free time. In summary, these are plausible ideas to try to create a connection with the students' learning needs and career goals. Throughout these explanations, some references to their previous classes and sessions will also help provide a continuum of learning.

Active Learning Approaches: The first session involves learning by doing where each student has a computer to work hands on using software in the lab to draw data flow diagrams individually as well as helping each other. They gradually work in groups like a pyramid – first in pairs exchanging ideas and assistance with the person sitting next to him/her, and then in groups of four to come up with a complete and ideal group diagram. In the second session, the students are to discuss a sample DFD and 'role-play' the case, with peer feedback from observing students. The next step is to go around the class, and let the students identify and explain possible areas on the diagram that may have IT impact. Overall, both sessions feature different and interesting activities but they use the same case; this helps to build knowledge by covering different aspects of the same topic.

Feedback to Learners: In addition to the teacher's feedback to learners, it is important to explore ways that they can give feedback to one another. For example, they discuss the case with each other in the first session as they draw the diagrams. In the second session, there is more discussion with peer feedback, between the role players and the observers (during and after the role play activity). The teacher also collects the diagrams submitted by each group for the purposes of feedback. During the sessions, the teacher regularly interacts with the students in order to understand their level of learning. Each session has formative assessment activities that help them review and measure their knowledge of subject related terminology. The students are encouraged to do the formative assessment seriously, and advised to study more depending on the results.

As a note for IT lecturers, students use two computer applications for drawing the diagrams: Microsoft Visio and Dia. Although not as commonly used as Visio, Dia is free and open source, as opposed to proprietary and commercial software. Free software makes an important contribution to education in general (Erturk, 2009). Therefore, teachers and students interested in diagram based role play do not need to be limited by financial concerns. Another interesting aspect for this type of activity is the how roles are distributed. Although the teacher is the facilitator, students are given a choice (Tolipov & Tolipova, 2015).

## **Evaluation of Teaching**

After the conclusion of the above sessions, the teaching was reflected upon and evaluated from the perspective of the three strategies that are part of the learning design process. In addition, a peer evaluation was done by an experienced colleague. The findings from these evaluations are as follows.

**Catering for Learner Needs:** Using a ball and throwing it between the students energized the dialogue as they took turns. Everyone got a chance to say something based on their interpretation during the second lesson. As a future improvement, a pre-prepared white board or a projected slide with a session outline can give the students a welcome and a compass for each session. Although the introduction and agenda were done verbally this time, this can be done at the beginning of every future session in writing without much effort.

**Active Learning Approaches:** Asking students to do pair discussions every now and then was effective in keeping students active within the classroom and associating with each other as learners. The crossword in the first session was interesting and different for the learners, and served well as an assessment and feedback resource while being puzzling and enjoyable at the same time. The quiz/lottery in the second session (which was also for the purpose of assessment and feedback) was also effective because it built anticipation and engagement among the students. Next, the students also participated enthusiastically and effectively in the role play activity. As the peer observer suggested, the role play activities can be made even more effective. This requires, for example, preparing the students ahead of time, spending more time getting people into their roles, and slowing and fine tuning the learning process.

**Feedback to Learners:** During the sessions, a strong amount of positive feedback and acknowledgement was given to students and their responses. This even included a funny component by presenting an Academy Award to the role players, and joking with the observers about Wellywood and Hollywood. The teacher selected student diagrams to base the role play session on, for critiquing and explaining the case. This was done after reviewing the diagrams they created in the computer lab in the previous session, also for the purpose of giving them individual feedback about their work with the software. According to the peer observer, this was a very validating move (using students' diagrams instead of textbook diagrams) and helped build the students' confidence. This was fair feedback as the work was good enough; but the potential impact on them as learners was also significant. One of the diagrams came from one of the groups that had been catching up with the other groups and had been somewhat withdrawn. Within two weeks after this, that particular group had become more confident and productive.

**Peer Evaluation:** Some of the comments from the peer observer have been mentioned earlier in this section. Furthermore, as noted by the observer, the session was well supported by other resources that were shown on the projector screen, such as slides, pictures, and references to the online learning materials.

During the observation, the students were enthusiastic and actively engaged. The following statement by the observer summarizes both the initial intent and the eventual outcome of this role play activity: "Learners were well supported by you with props and prompts. Clear links made between role play and communication expectations with lay people."

The peer evaluation report with details can be found in Appendix 2.

## Conclusions

Some ideas for future improvements have already been mentioned in this paper. Furthermore, there are other specific actions that will be discussed in this section of the paper. These are a result of the self-evaluation done by the teacher, while reviewing the success of the learning design plans.

After reflecting on the question of catering for learner needs, it is possible to use a computer game related case study next time for practice with the future cohort (instead of the library). This might draw them closer toward the learning activities. In turn, they can become even more enthusiastic about this type of work, and will still do more serious Data Flow Diagrams or Activity Diagrams for their course assignment anyway.

So far, the role play activities in this course have been concise and experimental. The future direction of role play in the course is to implement more sophisticated role play activities. In order to achieve this, it will be necessary to prepare the students more ahead of time, and to allow more time for students to familiarize with their roles. Longer role play activities are likely to cause more reflection, and students can learn even more from such an experience.

Next, it is important for teachers to improve their questioning skills, to help stimulate the learners during role play and afterwards to help them reflect. Although it is important to complete the lesson on time, it would be beneficial to give learners more time to ponder and formulate answers. It will be useful to put the questions in writing on the board or the screen. Alternatively, the questions can be given to the students in advance of a session (if possible or appropriate).

Providing time for discussion and digestion is important for teaching practice in general. This is true both for the LBKO (learning is building knowledge with others) approach and for the LIS (learning is individual sense making) approach (Watkins, 2011). The students' self-directed learning time can also be used better for digestion and application of knowledge and skills.

Therefore, it is interesting to consider the students' learning styles, not just in the classroom but also outside. In order to understand a specific group of learners better, it is important to have deeper learning conversations with them about how they are studying and making progress outside of the class meetings. This would help the teachers get to know them better and provide more innovative or authentic feedback and support. In turn, these would better prepare the students for role play and other active learning strategies.

Role play as an active learning strategy can be used, not just in face-to-face classes, but also in blended or distance learning. This type of learning activity can be implemented more often in the context of business and computing courses. Teachers, who have already used this strategy before, can continue to experiment with role play by thinking of new scenarios for their courses.

## References

- Biggs, J. & Tang C. (2011). *Teaching for quality learning at university* (4th ed.). Maidenhead, England: Open University Press.
- Börstler, J. (2010). Using role-play diagrams to improve scenario role-play. In G. Engels, C. Lewerentz, W. Schäfer, A. Schürr, & B. Westfechtel (Eds.), *Graph Transformations and Model-driven Engineering* (pp. 309-394). Heidelberg: Springer Verlag. doi:10.1007/978-3-642-17322-6\_14
- Case, G. & Cheek-O'Donnell, S. (2015). A better way for role play [Workshop notes]. Available at [https://medicine.utah.edu/faculty-dev/programs/academy-med-education/docs/symposium\\_2015\\_powerpoints/ws-a-better-way-for-role-play.pdf](https://medicine.utah.edu/faculty-dev/programs/academy-med-education/docs/symposium_2015_powerpoints/ws-a-better-way-for-role-play.pdf)
- Coffield, F. (2008). *Just suppose learning and teaching became the first priority*. London, England: Learning and skills network (LSN). Available at [http://www.itslifejimbutnotaswewknowit.org.uk/files/Cofffield\\_IfOnly.pdf](http://www.itslifejimbutnotaswewknowit.org.uk/files/Cofffield_IfOnly.pdf)
- Costain, G., & McKenna, B. (2011). Experiencing the elicitation of user requirements and recording them in use case diagrams through role-play. *Journal of Information Systems Education*, 22(4), 367-380.
- Erturk, E. (2009). International technology transfer: the case of free computer software. Paper presented at the International Academy of Business and Public Administration Disciplines (IABPAD) Conference, Orlando, Florida. Available at [http://repository.digitalnz.org/system/uploads/record/attachment/596/international\\_technology\\_transfer\\_the\\_case\\_of\\_free\\_computer\\_software.pdf](http://repository.digitalnz.org/system/uploads/record/attachment/596/international_technology_transfer_the_case_of_free_computer_software.pdf)
- Green, D., & Blaszczynski, C. (2012). Effective strategies and activities for developing soft skills. *Journal of Applied Research for Business Instruction*, 10(2).
- McSharry, G., & Jones, S. (2000). Role-play in science teaching and learning. *School Science Review*, 82, 73-82.
- Millet, I. (2009). Student perceptions of data flow diagrams vs. use cases. In L. Tomei (Ed.), *Information Communication Technologies for Enhanced Education and Learning: Advanced Applications and Developments* (pp. 94-102). Hershey, PA: Information Science Reference. doi:10.4018/978-1-60566-150-6.ch007
- Race, P. (2010). *Making learning happen: A guide for post-compulsory education* (2nd ed.). London, England: SAGE Publications Ltd.
- Reeves, T. C., Herrington, J., & Oliver, R. (2002). *Authentic activities and online learning*. Paper presented at the Higher Education Research and Development Society of Australasia (HERDSA) International Conference, Perth, Australia. Available at [http://researchrepository.murdoch.edu.au/7034/1/authentic\\_activities\\_online\\_HERDSA\\_2002.pdf](http://researchrepository.murdoch.edu.au/7034/1/authentic_activities_online_HERDSA_2002.pdf)
- Tolipov, U., & Tolipova, F. (2015). Didactic Games and their role in the continuous educational process. *The Advanced Science Journal*, 3, 29-31.
- Watkins, C. (2011). *Learning: a sense maker's guide*. London, England: Association of Teachers and Lecturers (ATL) - the education union. Available at <http://www.atl.org.uk/Images/Learning%20a%20sense%20makers%20guide%20-%202011.pdf>



## Appendix 1: Lesson Plan

<b>Learning Activity</b> <i>What will the learner 'do'?</i> The learner's "journey". Describe what the learners are required to do, how they will make sense of the learning. Activities that are assessable – put an asterisk (*). Identify lesson sections: warm-up, development, assessment, closure/review.	<b>Learning Support</b> <i>What will the teacher do?</i> The support strategies a teacher will organise to assist students in their learning, e.g. guide, support, instruct, manage groups, feedback.	<b>Resources</b> What will the learners and the teacher use or produce during the activity?
	<p>Welcome and introduction: importance and relevance of diagrams for developers and analysts</p> <p>Show them resources on EIT online; give them instructions for the role play activity</p> <p>Ask them to give peer feedback</p> <p>Explain and initiate the 'Round' learning activity</p> <p>Conclusion: Summarize and question the students, and also invite feedback</p>	<p>Picture of game flowchart (show briefly)</p> <p>Slide with the case for drawing DFD</p> <p>Diagrams created by students last session</p> <p>Picture, candy, and ball for encouragement</p> <p>Slide with the formative assessment quiz</p> <p>Week 7 forum for feedback</p>

## Appendix 2: Peer Observation

Topic: Data flow diagrams

Catering for learner needs:

Some of the positives:

- Colour coding of library system diagram assists learners to bundle different components of data flow
- Role play provided a valuable experiential learning activity which demanded translation of data flow diagram into real-life sequences
- Conclusion – provided information to students about 'next steps' giving them a sense of direction

For your consideration:

Work on allowing time and space for learners to respond to your questions. There were a number of occasions where you moved on too quickly, not allowing time for students to ponder the question before offering a response.

### Learning activities:

This session was 'activity-rich' and so provided some sound learner-centred opportunities for building new understandings. Specific activities included:

- Role-play activity – case and library data-flow system slides shown in advance to provide clear context for activity. Role play provided opportunity for students to deconstruct a data flow diagram and perform the described actions, in a context (i.e. library) familiar to learners. This brought the data-flow to life. Learners were well supported by you with props and prompts. Clear links made between role play and communication expectations with lay people.
- Pairs discussion re what areas might have an IT factor, saw enthusiastic and focussed engagement

### Points to ponder:

- An awesome first-time role-play activity! I encourage you to explore the value of spending a little more time getting people into their roles (non-participants can help here too), slowing the process down and re-running certain parts to develop the character further or build in observer feedback, to enhance learning.

### Feedback to learners:

Some of the ways I observed you offering feedback to or providing feedback opportunities for learners were:

- Selecting a student diagram for an in-class activity is very validating for the learners and serves to build confidence
- Your responses to learner questions are generally acknowledging of the intention of the question, and provide clarification for the learner

### Food for thought:

- Don't forget that with some questions asked of you, you can throw them back to the student cohort, instead of responding yourself – this can also provide useful feedback to learners about their understanding

### Conclusion:

Your learning design overview is incredibly thorough and your lesson plan well organised and sequenced. You used a range of resources effectively within the session – slides, EIT online, reference to the text – and provided diverse learning activities which saw the student cohort actively engaged in their own learning. Thank you for the opportunity to observe your teaching practice. Keep up the exciting development.