

Learning Design Implementation for Distance e-Learning: Blending Rapid e-Learning Techniques with Activity-based Pedagogies to Design and Implement a Socio-constructivist Environment

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Abstract

This paper discusses how modern technologies are changing the teacher-student-content relationships from the conception to the delivery of so-called 'distance' education courses. The concept of Distance Education has greatly evolved in the digital era of 21st Century. With the widespread use and access to the Internet, exponential growth has been experienced in the field of multimedia and web technologies. These developments have greatly reduced the significance of the term 'distance' in Distance Education.

Consequently, the term distance stands as a paradox in the globalised networked environments. As a result with new communication and collaboration tools, and possibilities to disseminate high quality audio, video and interactive materials over the information superhighway, the educational design process of distance education materials has new perspectives to explore in order to improve and even re-engineer the overall 'distance' teaching and learning concept.

This paper looks at how the educational design process changes with technology and provides a few examples of how modern tools and techniques are being used and implemented to design high quality (socio)-constructivist learning environments. It proposes an integrated model for learning design supported by implemented case-studies in the context of learning transformation processes that are ongoing at the University of Mauritius. The aim is to demonstrate how the blending of innovative technologies and pedagogies can result in high quality constructive learning experiences that eliminate the 'distance' paradox in so-called distance learning environments.

The Distance Education Paradox and the Internet

A definition for distance education

The main defining feature of distance education is the separation of teacher and learner, usually in both time and space (Holmberg, 1989). This separation fosters non-contiguous communication (communication that occurs between the learner and teacher from a distance), which has to be mediated. Consequently, mediated communication becomes the second defining feature of distance education (Rumble, 1989). Mediated communication is an important feature in distance education. Distance education is flexible and adaptable in that learners can study anywhere and anytime. The notion of flexibility and autonomy has been seen to denote independence among distance learners. Garrison and Shale (1990) however, postulate that the notion of independence in the educational transaction in distance education seems to overshadow two-way communication between the teacher and the student. They state that the educational process is dependent upon sustained dialogue and negotiation between teacher and student. It is therefore obvious that although emphasis is laid on the notion of flexibility and independence, the quality of education and student learning that is disseminated should not be overlooked.

The promotion of the distance education concept has largely been attributed to three main phenomena namely demands for this type of education, economic need to reduce educational costs and the introduction to information and communication technologies. Indeed, government policies encouraging life-long learning and the need for the construction of knowledge economies have led to increase in demands for such type of courses. Finally, new technologies such as the Internet, phone, emails and satellite television has made this mode of education highly accessible to many people. Information and

communication technologies are seen as very efficient and rapid ways of disseminating educational materials to students who are connected anywhere throughout the world.

The Distance Education Paradox

Garrison (1990) argues that the paradox that exists in distance education is that it is a phenomenon that has proved its existence but has not yet been able to define itself. This paradox, according to Garrison (1990) is the result of laying focus on the term “distance” more than the term “education”. Different authors have been trying to put emphasis on distance education as an educational process but from somewhat different perspectives. According to Garrison, it is possible to overcome the teacher-student distance problem by a combination of educational methods and interactive technologies. For instance, two-way communication can be mediated by tools like audio and video conferencing as well as computer-supported conferencing. For some authors like Garrison and Shale (1990), the teacher-student interactive relationship is very important in an educational setting while Marjanovic and Orłowska (2000) stress that the challenge is not to re-create the face to face teaching situation with all its inherent problems with new technologies, but rather create new learning environments providing unique communication patterns, changed limitations to the types of learning activities that are possible and provide a new high quality learning experience.

In any of the two perspectives of looking at the distance education process, there two common aspects, interaction and mediation, that need to be present. In some situations, interaction takes place between learner and content, learner and tutor or tutor and content. The concept of interaction in fact, can be seen as a reconciling figure for the two perspectives. Interaction makes us realize that both perspectives are as important as each other to promote the learning process. In fact Garrison (1990) postulates that in the absence of direct bi-directional communication, the teacher – student relationship takes the form as shown Figure 1 below:

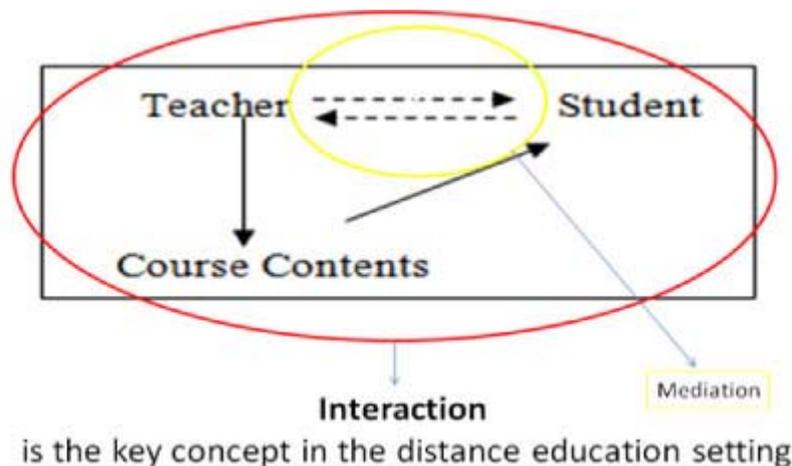


Figure 1. Teacher-Student Relationship in Distance Education – Adapted from Garrison (1990)

The figure illustrates the idea that the self-instructional contents are sent to the students (on printed media, CD/DVDs or TV programmes). The student reads and “assimilates” the knowledge destined to him or her through the various documents. Negotiation with the teacher to validate assimilated knowledge is then done mostly in asynchrony.

The emergence of the Internet and Information and Communication Technologies

The rapid development in Internet technologies strengthened the world-wide web (WWW) as the platform of choice to support the distance teaching and learning process. There is the possibility of using web-based hypermedia materials provided a framework to create new learning environments supporting a far wider variety of interactive learning activities (Paquette et al., 1995). Computer-based chats, video and audio conferencing made it possible to provide for the interaction between and the mediation of the student-tutor relationship both in a synchronous and asynchronous way (Gal-Ezer & Lupo, 2002) thus leading to highly reduced significance of the distance issue in distance education. The recent progress in mobile computing and the growing influence of internet tablets on our daily routine have further reduced the ‘distance’ significance and reinforced the proximity, interaction and mediation that occur within the entities of the teacher-student-content model (Pei-Luen et al., 2008).

It can therefore be reasonably argued today that the technological models for distance education have evolved and are greatly shaped by current information and communication technologies. Distance e-learning is a common term to reflect on this evolution. This also implies an evolution in the methodologies used to create courseware and the types of pedagogies that can be supported. These are referred to by Garrison (2000) as transactional issues, who argued that the 21st century represents the

post-industrial era where transactional issues (i.e. teaching and learning) will predominate over structural constraints (i.e. geographical distance).

The figure below illustrates how the teacher-student-content model has been materialized in three different educational frameworks.

Conceptual Frameworks			
Traditional Education	Distance Education	E-/Online Education	model
Physical Classroom Face-2-Face & Synchronous Same time Same Place	The manual Asynchronous Different Time/Place	Virtual Classroom Content Real Time Asynchrony	modality
Chalk & Board Projector Markers	Paper/VHS/Radio/TV Telephones/Faxes	Digital Mobile Networks Multimedia/web 2.0 Knowledge Marts (www) Social Networks (www)	Educational technology

Figure 2. Conceptual Educational Frameworks illustrating Model, Modality and underlying (Educational) Technology

The figure above, although not necessarily exhaustive, clearly demonstrates how technology has changed the modalities and this affects mainly the nature of the interaction between the teacher, student and content as well as how the interactions and communications are mediated. Furthermore, the technology has also changed the ways that content can be authored and presented to the learner and thus offering a wider choice of pedagogical design approaches.

The current work

While most educational designers would tend to prefer either mass-customisation techniques like rapid e-learning, others would emphasize on constructivist approaches such as collaborative work, reflective practices and skills acquisition. In this work, the discussion is around the key element of whether those two distinct approaches can be integrated in a single teaching and learning framework and it looks at how this is being achieved in a distance e-learning environment at the University of Mauritius. We look essentially at the *post-industrial* era of distance education, focusing on practice, where the emphasis is on the techniques and methods for the re-design of and value addition to the teaching and learning process (Nichols, 2003). More precisely, it will look at the educational transaction with specific reference to the authoring of content and learning activities that can promote active learning, and knowledge construction through interactive collaboration and communication tools.

Methodologies for distance e-Learning

The Classic e-Learning Model (the e-book)

The classic e-learning model is what we refer to as being mainly content-focused HTML websites that are structured in Chapters and Sections. This type of approach is not too different from the e-book concept. The e-book is a new information technology product that facilitates reading and acquisition of information. It is a written work readable on the screen of a PC, a PDA (personal digital assistant), or a reader specifically designed for the purpose (Kang et al., 2009). Gorghiu et al. (2011) argue that due to being widely spread in the digital era, the e-books are one of the most effective ways to support distance learning (e-learning), as they can be read by thousands of readers. This argument joins the one put forward by Garrison (2000) regarding the industrial era of distance education where focus was laid on the structural elements rather than the educational transaction.

The one-size-fits-all perceived advantage of e-learning has been criticized by authors (Nichols, 2003) to provide for a lack of personalisation of such learning environments. This is mainly because many have been trying to re-create the traditional settings with the support of technology and the e-book concept or its equivalent HTML websites pose the same issues. They are mainly focusing on the new technology to be a new form to disseminate materials rather than a way to add value and reconceptualise the teaching and learning process. The focus is still on knowledge transfer through reading, memorization and drill and practice exercises. Some researchers, for instance, Tseng (2007, 2008) suggest students would prefer print a paper and read rather than reading from screen. However, Osborne and Holton (1988) reported that there is no significant difference in speed of online reading and comprehension when compared to paper.

Traditional e-learning development methodologies rely to a significant extent to the traditional model of distance education courseware development. First generation e-learning which mainly focused on HTML-based websites and internet based communication tools predominantly used the ADDIE model as the main instructional design technique (Lohr, 1998). Figure 3 illustrates a high-level process for the authoring of 'classic' e-learning courseware.

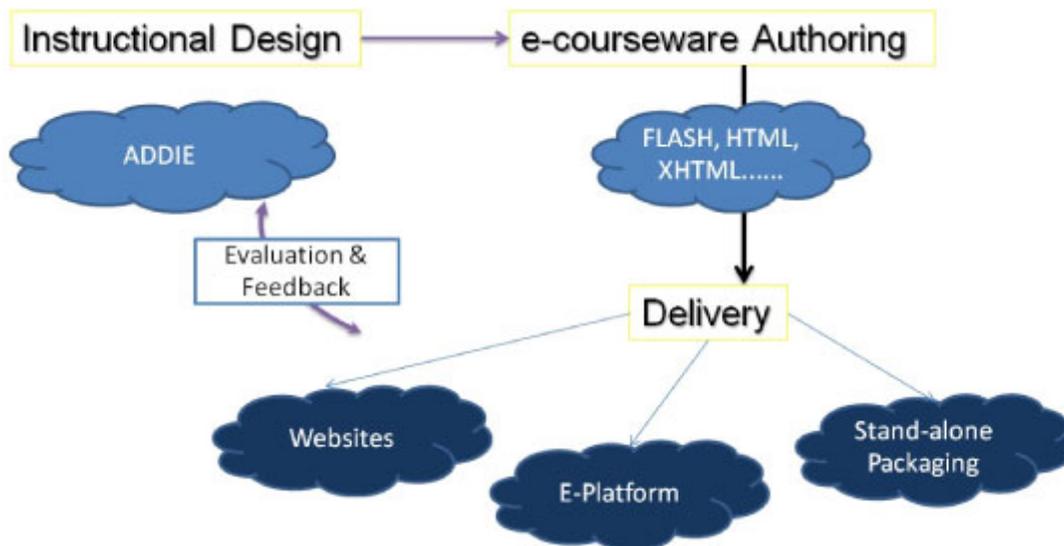


Figure 3. A simple process model for developing e-learning content

Courseware writing and development for the World-Wide Web is technically no different with regards to paper-based manuals. The main difference is that the publishing medium and the way the content is diffused are different. Figure 4 illustrates contents that have been published in a web-based format following an ADDIE process model. The instructional design concept is based on the traditional book/manual where contents are well-structured into chapters and topics.

Teaching for Good Behaviour

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Overview

The quality of our teaching inevitably has an impact on the behaviour of our students. This unit considers some of the factors that can contribute to misbehaviour in the classroom and some of the steps that we can take as teachers to re-engage students with the learning process. This unit considers the format of lessons, how lessons are delivered, how to present lesson content in an interesting and creative way, and the development of "engaging lessons".

Learning Outcomes

The learning outcomes for this unit are:

- exploring the links between lesson format and learning styles
- examining quality lesson delivery and its links to good behaviour
- experimenting with new and innovative approaches to planning and teaching

Figure 4. ADDIE Model and Courseware Authoring in Practice

The ADDIE model has also been subject to criticism as it is not seen to be applicable in the modern technology-based era. The criticisms targeting ADDIE are consistent with those arguments highlighting the drawbacks of the traditional waterfall model for software development. ADDIE is a waterfall-like model that spans over a long time period, and requires a variety of resources and persons with different skills so that a final product can take form. Many practitioners even regard ADDIE as only a process model rather than an instructional design model (CreateDebate.com, 2009).

The e-book approach has also come under scrutiny mainly by advocates of socio-constructivism who put forward the argument that the world-wide web is already in abundance of content and adding more content to it will not be necessarily beneficial to the learning transaction. Indeed the focus should be on how to use the abundance of material out there to design meaningful learning activities and actively engage the learners (Schneider, 2003).

The Rapid e-Learning Methodology

Rapid e-learning is a term that has emerged from the concept of rapid development as applied to the software development industry. The key is to acquire the ability to develop and deploy high quality interactive multimedia e-learning courses which are generally short to medium length learning units in a minimum amount of time (Brandon, 2005). Rapid e-Learning is an emergent methodology that has recently gained momentum as more and more user-friendly authoring tools are being developed.

There are a number of authoring tools both open-source and proprietary ones that support a rapid development approach for e-learning courses. While rapid development emphasize on reduced time and effort spent on analysis and design phases, they are still very crucial especially in projects where it is important to meet requirements in a short time-frame (Beymon-Davies and Holmes, 2002).

Figure 5 below illustrates the model used at the University of Mauritius. It shows how rapid e-learning development can be integrated in the design of distance e-learning environments.

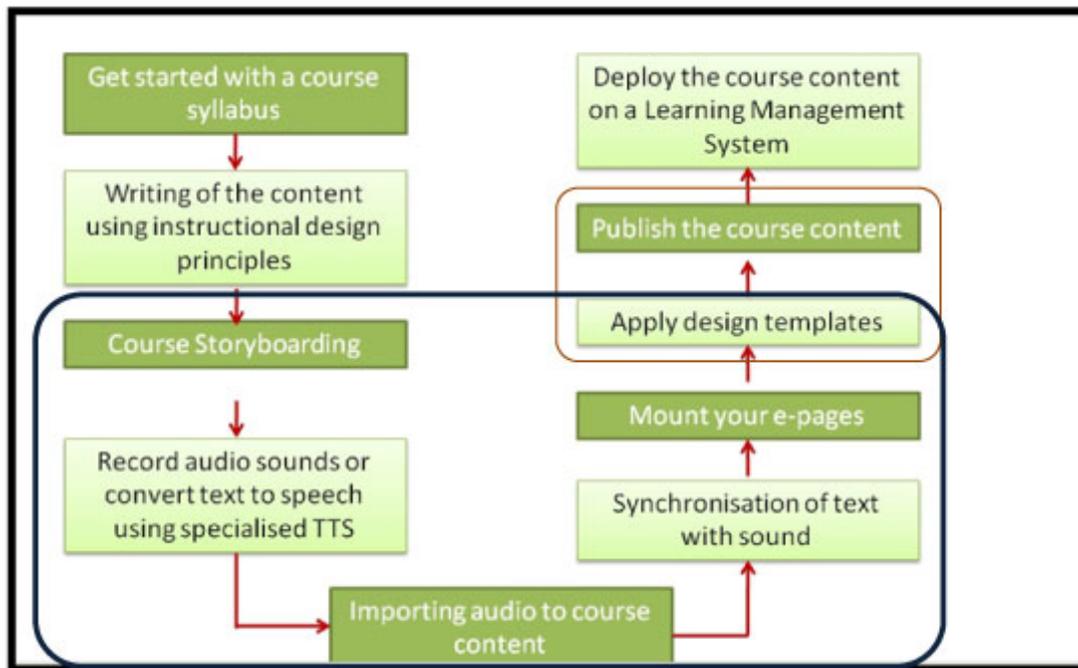


Figure 5. Integrating rapid methodology in distance e-learning courseware development

The first two steps are important in any distance education course usually referred to as self-instructional materials. Rapid e-learning assumes that content for a particular course is available (PDF, Word document, Printed Manuals). At the University of Mauritius, rapid e-learning takes the form of Interactive Video Lectures which try to recreate the environment where the student feels that he or she is listening to a 'live' lecture but which is augmented by shifting the control of the presentation to the learner rather than the teacher as in traditional environments (Rughooputh and Santally, 2009). The technique uses Microsoft PowerPoint as the main storyboarding and authoring tool. Most of the steps as highlighted in Figure 5 above can be completed using a simple tool like Microsoft PowerPoint.

At the University of Mauritius, three different metaphors have been conceived for rapid e-learning development, namely the Tablet Metaphor, Lecture Metaphor and finally, the Interactive WhiteBoard Metaphor (Figure 6).

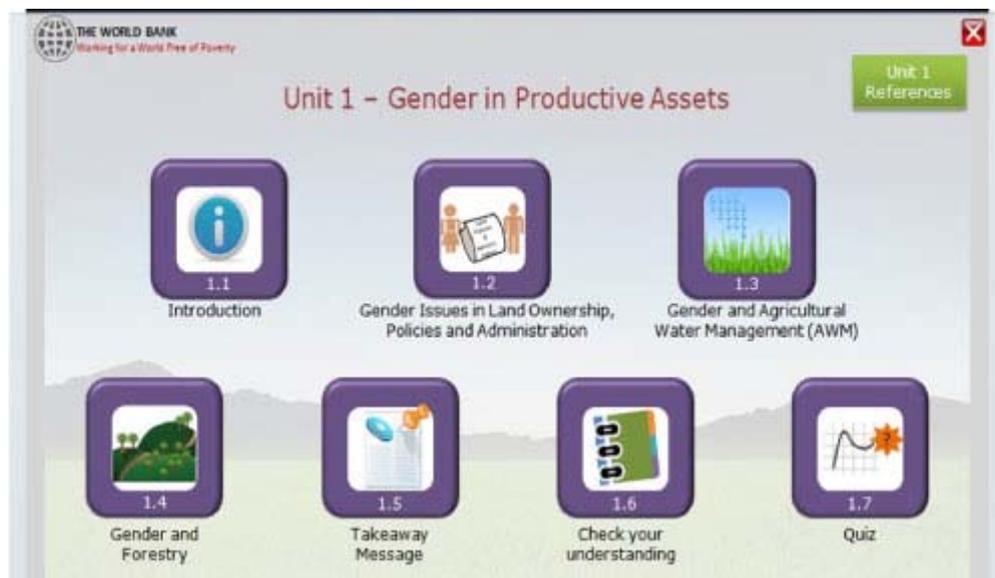


Figure 6. The Tablet Metaphor

The Tablet metaphor has been used to design the user interface and the navigational structure of a short professional development course in collaboration with the Commonwealth of Learning for World Bank staff working in Agriculture. The Tablet metaphor works fine when content granularity is small and the hyperlink structure is not very complex. For instance, when the learner clicks on Section 1.1 he or she gets to a set of 4-5 pages that can be browsed in a linearly. At the end of the section, the learner gets back to this screen and then gets on to the other section. The sections are accessible independently of each other and are loosely coupled in terms of the hyper-text structure. The key of the Tablet metaphor is simple navigational structure and visually appealing icon-based design. The Tablet metaphor is to some extent a redesigned e-book where focus is more on reducing the cognitive load on the learner as it reduces the

amount of text displayed on the screen. It can however be seen as another type of self-instructional material in the context of distance learning (Mayer & Moreno, 2003).

The Lecture metaphor (Figure 7) is based mainly on the traditional lecture style where a teacher would explain in detail the different points highlighted in his PowerPoint Presentation. The Lecture metaphor when applied to e-learning design results in essential a multimedia presentation where on-screen text and images are synchronised with a voice explanation for each slide (Rughooputh & Santally, 2009). This has three advantages over the traditional lecture. The first one is that the lecturer can plan well in advance what he or she wants to say on a particular topic, and the multimedia presentation will ensure that this exactly happens irrespective how many times the presentation is broadcasted. The second advantage is that it minimises division of attention given that in a traditional lecture a student's attention will be split between the body language of the lecturer and the material on the presentation (Mousavi et al., 1995; Mayer & Moreno, 1998).

The third perceived advantage is that the student can view a lecture a number of times as he or she wishes and at a time of convenience to the latter.

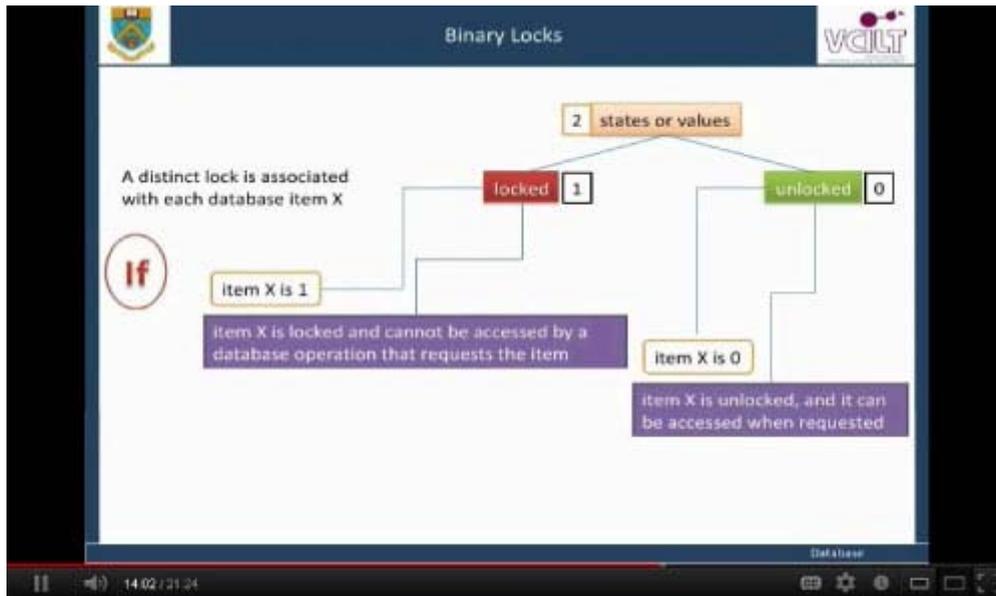


Figure 7. The Multimedia Presentation/Lecture simulating the Lecturer's in-class intervention

The Interactive Whiteboard metaphor extends the Lecture as it provides the student with augmented interaction as activities such as MCQs, drag-and-drop as well as controlling the flow and sequence of the lecture.

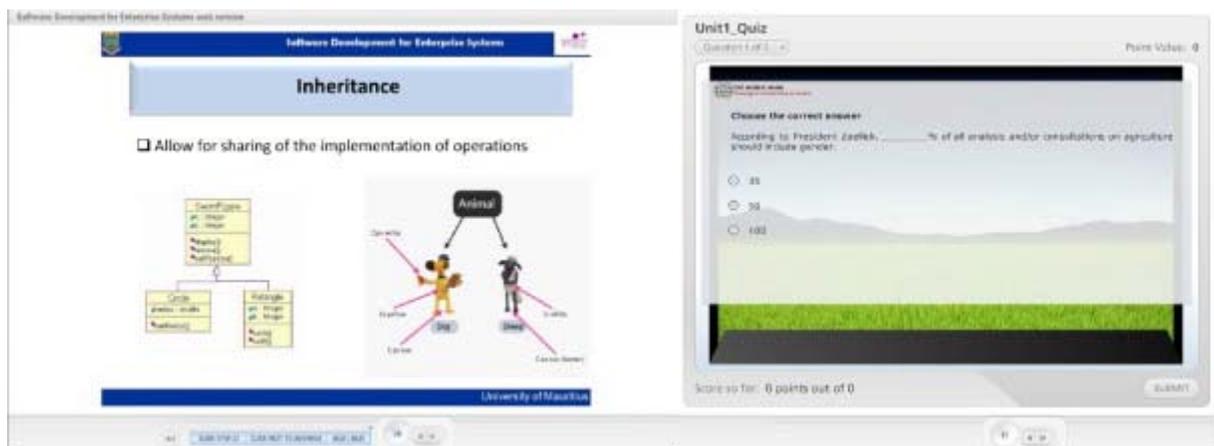


Figure 8. Increased learner control per slide and interactive drill & practice exercises

By increasing learner control and providing additional interactivity makes the Interactive Whiteboard metaphor an appropriate technique that addresses to some extent, although in a different way, the critique of distance education environments lacking the teacher-student interaction present in face-to-face classrooms.

Modelling Learning as an Activity

Proponents of constructivism would define learning as an active process of knowledge construction

through development of competencies and skills through authentic activities and through interaction with their environment (Shieh, 2012). The concept of constructivist learning has often been extended to socio-constructivism which further argues that by peer interaction, group reflection and discussion, learners are able to challenge their own representations and that of their peers to build on their existing knowledge (Wood et al, 1995).

Activity-based learning has been adopted as the main pedagogical approach in the Masters in online Educational Technology programme of the Virtual Centre for Innovative Learning Technologies since 2004. It was an adaptation of the TEAL (Technology-Enhanced Active Learning) approach adopted by the Massachusetts Institute of Technology in 2001. Accordingly, TEAL emphasizes active learning and small-group discussion during the instructional process. The class interaction and discussion is accomplished through the support of the Interactive Response System (IRS), which allows the instructor to pose questions, and track and assess students responses to the discussed questions individually and immediately (Shieh, 2012). In an e-learning environment, the concept of technology-enhanced active learning has to be adapted to fit in the asynchronous nature of human interactions and the concept of distributed locations as compared to the Interactive Response System used in the MIT's TEAL project which is mainly applicable in a face-to-face setting.

Paquette (2003) devised a method called MISA, an instructional design method specialised at the design of technology-enhanced active learning environments. MISA is a technique focusing on two main components that are deemed as crucial to the instructional design of TEAL environments. These are the pedagogical model (Figure 9) and the knowledge and competency model. A modelling tool with a built-in taxonomy known as MOT has been developed to support the MISA method.

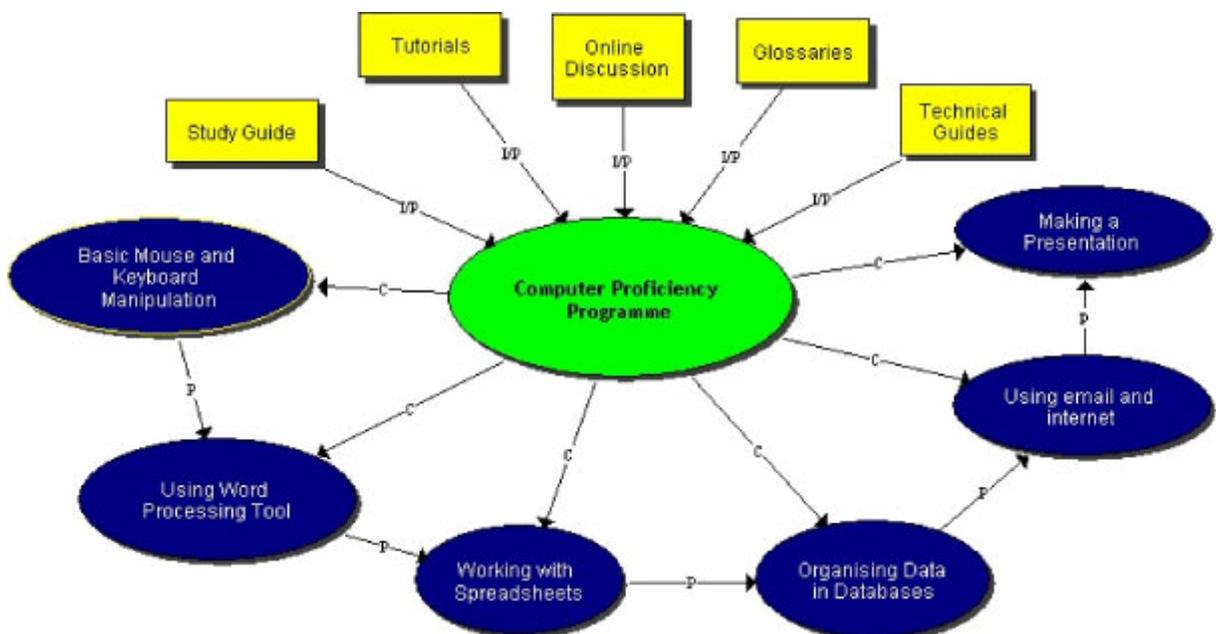


Figure 9. Pedagogical model for an introductory course in computers

As can be seen from Figure 9 above, the focus of an activity-based approach is to get the learner to be engaged in real tasks that will result in development of skills and competencies. The action verbs used to describe learning activities (oval shapes of blue colour) reflect this philosophy. Figure 9 demonstrates the corresponding knowledge and competency model for the learning activity "Using Word Processing Tool".

The schema is a graphical representation of how the different competencies and knowledge structures that are expected for the learner to acquire (learning outcomes) are linked together.

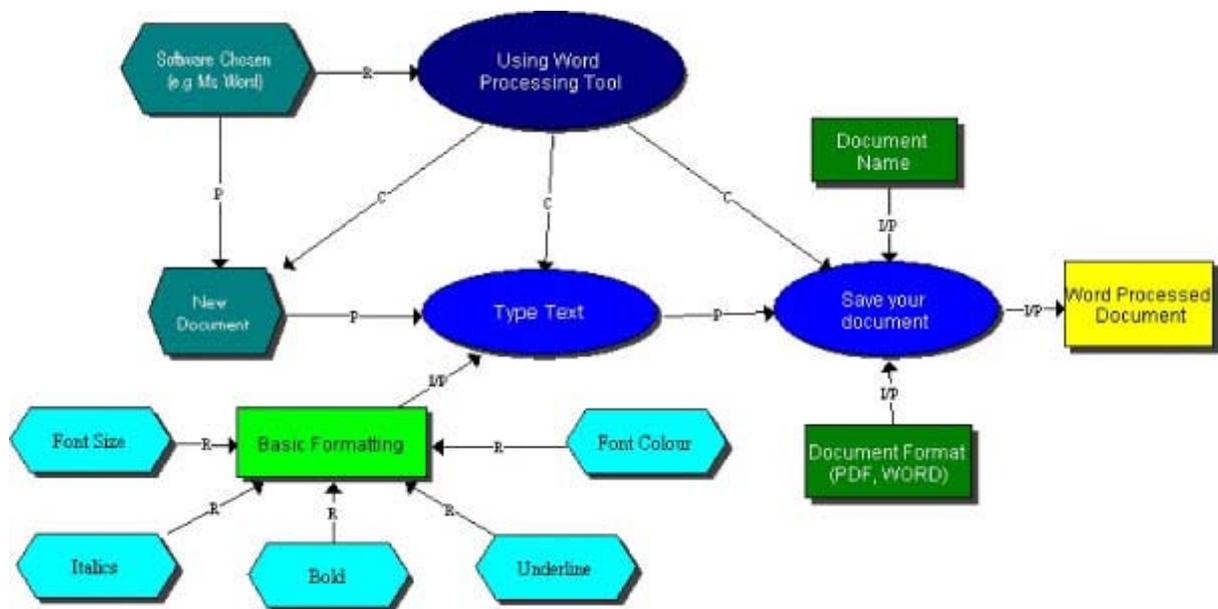


Figure 10. Knowledge and competency model using MISA approach and MOT taxonomy

This can be considered as a graphical equivalent (with a specific taxonomy) of the application of Bloom's Taxonomy to define learning outcomes, assessment criteria and course structures in traditional instructional design. The whole activity is completed when an artefact (word-processed document) is produced. From the figure, the following pedagogical elements can be observed:

- Core Competency
 - Ability to use a word-processing tool such as MS Word
- Primary Skills
 - Create a blank new document
 - Typing text and carry out basic formatting
 - Name a document
 - Save the document in the prescribed format

An Integrated Model for Learning Design

The main question in this paper is how to blend the three different pedagogical conceptions of distance e-learning into one learning design method to design competency-focused, content-driven and interactive socio-constructivist learning environments. Such a learning environment will have to integrate the three roles of the world-wide web in changing the distance education landscape, that is as a new and efficient media to disseminate learning materials, to provide added-value to existing content using highly interactive hypermedia structure and finally to provide an innovative platform to reconceptualise the teaching and learning process (Nichols, 2003).

In this section two possible variants are discussed for an integrated framework that can be used to combine the three pedagogical conceptions into one learning design method. The first model would have a structure where a course can be broken down into learning modules. For instance a course of 45 hours duration can be broken down into 3 modules of 15 hours duration each. Each module can consist of a number of (online) sessions and each session is organised as per the layout in Figure 11.

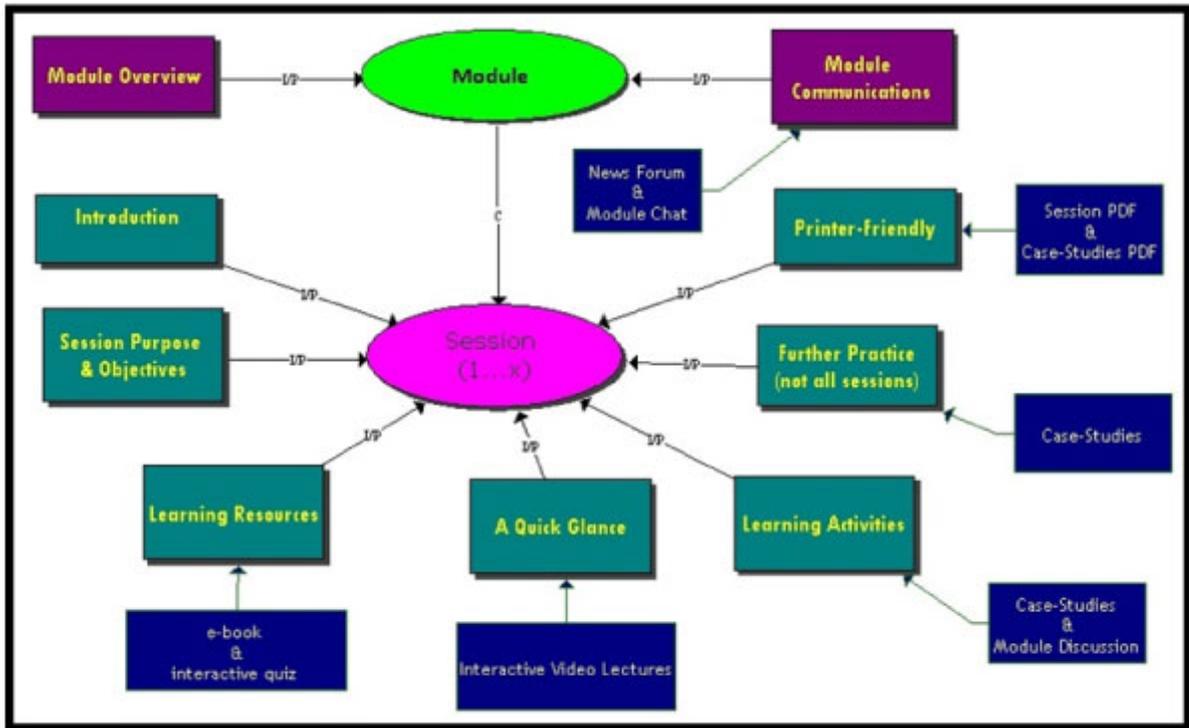


Figure 11. Structure of a module blending the three pedagogical conceptions

To complete successfully a learning session, learners have access to 'Learning Resources' which take the form of e-books, interactive quizzes and exercises (drill and practice). These are complemented with interactive video lectures under the 'A Quick Glance' section. For each session, under the 'Learning Activities' section, learners have to work on a set of real-world and contextualised case-studies either in group or individually. Learning activities can also take the form of discussion forums to foster critical thinking skills for instance. They have access to communication and collaboration tools to either communicate with the course tutor or their peers.

The second model places the learning activity at the heart of the learning process. The sections such 'Learning Resources', 'A Quick Glance' and 'Printer-Friendly' as in Figure 11 above no longer appear at the upper level of the framework. They appear progressively in each step/sub-step of an activity depending on their relevance for that particular step/sub-step. The 'Learning Activities' section does not appear as such and may only take the form of a 'Submission box' with instructions to learners regarding submission of their work.

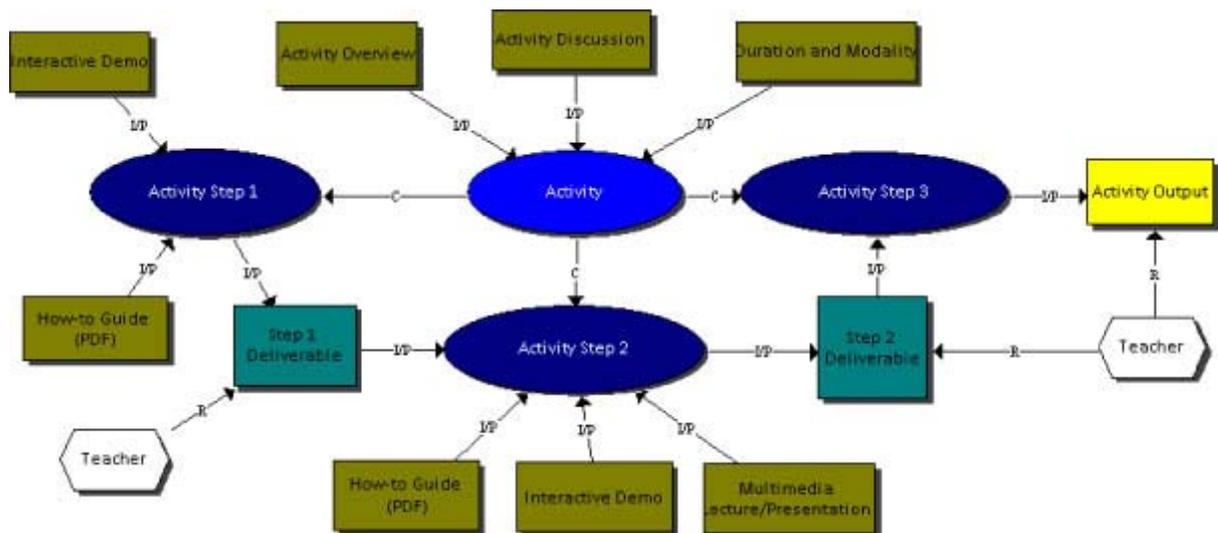


Figure 12. The Learning Activity at the centre of the educational transaction with Interactive Videos and e-Books to support knowledge construction

Contrary to the first variant, the teacher has a more active role in this process as his intervention is constantly needed as a kind of moderator as he or she has to give feedback and guide the student at each step's deliverable. This work has to be done in addition to the marking of the final activity deliverable (activity output) as well as his or her constant synchronous or asynchronous interventions on discussion forums, email or chat sessions.

Implementation Case-Study

In this section we elaborate how the integrated framework has been applied in an operational context using the MOODLE LMS at the Virtual Centre for Innovative Learning Technologies. A learning activity in one of the educational technology courses delivered to around 800 first year University students is taken as example. This section will be a walkthrough from the conception of the learning activity to its execution by the students.

Learning Activity Case-Study - Creating Storyboards for Multimedia Animation

The students have about three weeks to complete this learning activity. The main output of this activity is that each student will create his or her own storyboard for a particular multimedia animation resource. It is an individual learning activity. This activity consists of two sub-activities namely (1) Writing of the script and (2) Creating the storyboard.

To carry out the 'Writing of the script' sub-activity, the students have to do the following:

- Read the document titled "Basics of Script Writing".
- Watch an animation on the 'water cycle' from a given web link.
- Note down in a template document the sequence of each animation i.e. what is happening in each scene.
- Compare the document with the sample script as available on the e-learning platform.
- Amend as necessary, finalise and submit for tutor feedback.

After receiving the tutor feedback they can proceed to the next sub-activity and they have to carry out the following steps:

- Look at the sample storyboard that is available on the e-learning platform.
- Read the document 'Guidelines for creating storyboard'.
- Create a hand-drawn storyboard based on the water-cycle animation and the script created in the first sub-activity. Use the storyboard template provided.

During both sub-activities, students have access to a Q&A forum where they can discuss with peers and their tutors to clarify issues of concern and confusion and to receive appropriate guidance.

738 students completed the learning activity and this is characterised by online submission on the e-learning platform. 228 students submitted their work ahead of schedule, 89 on the due date and 421 submitted behind schedule. Students submitting after deadline were not penalised as flexibility of assignment submission is a key concept in this course. The idea is that students submitting one assignment late will have to input more effort to complete it given that another activity would have started. Despite the flexibility there is a final date for submission of all learning activities, a date that marks the end of the course. The students were divided in four batches where each batch was allocated a group tutor who acts as a learning facilitator.

At the end of the learning activity, the work is marked as per the assessment criteria. The assessment criteria are communicated to the students prior to the learning activity. The students also have access to a personal learning journal where they will provide feedback and record their own reflections on the learning process. The learning journal requests students to enter information about the following:

- How did they carry out the activity?
- What do they perceive to have achieved after completion of the activity?
- What benefits did they gain in terms of skills, competencies and learning experience?
- What are the learning difficulties they experienced and how they overcame them?

There were 669 journal entries which is the sum total for all the learning activities of the course. Most students revealed that they started by checking the theoretical foundations such as reading the theory either from documents on the e-learning platform or through complementary search on the internet. Then by following instructions students were able to get through the activity. Students pointed out that tutor interaction and the Q&A forum (peer interaction) helped them significantly to advance.

All students who submitted the activity achieved the minimum pass mark of 40 % and the quality of the works varied from average to very good. There was no indication of significant differences in terms of quality of work based on their submission dates. However, the important element was that learners achieved the outcome of the activity by being able to produce the needed output, which is the storyboard. The snapshots below show a sample work of one student engaged for storyboarding activity.

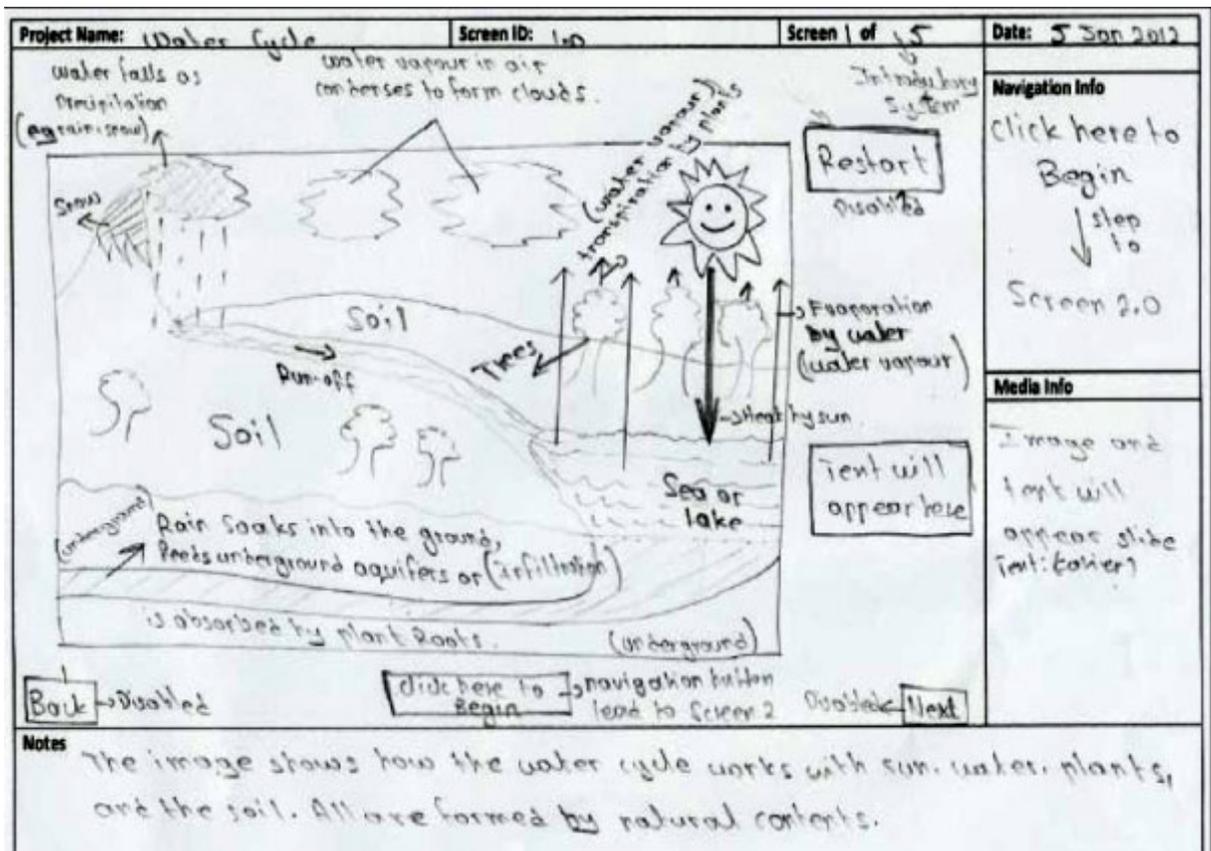


Figure 13. Sample storyboard produced by a student

In terms of what they perceive to have achieved after this activity, a few student comments are included to give an idea of the perceptions (in terms of achievements, skills, learning experience and difficulties):

Drawing the storyboard was one thing that I have surprisingly enjoyed. I was sceptical beforehand. I guess I thought my doodles would not be enough for that. I still remember how I planned to spend a whole afternoon with it, instead, as soon as I had taken my pencil and sketched the first snapshot, the rest just followed naturally.

This was indeed a very interesting activity. First we have to view the whole story and the pause it each time. Hence we draw the respective drawings. From the drawing we can thus interpret the whole story. We also have to write a script.

The storyboard assignment was quite a challenge to me. Eventually however, I was able to understand the concept and proposed the story board on the water cycle. I chose my slides in a manner that demonstrates a chronological flow in the process. Nevertheless, the drawing aspect was rather ruthless since I do not excel at such things.

If possible it would have been better if one class was held for every assignment to help students who sometimes didn't know what or how to proceed with the assignments. The assignments I had got much difficulty with in the beginning were the storyboard as I was not able to understand the screen concepts. However, after watching the video on water cycle a hundredth time I was surely able to do it properly.

On the other hand, concerning the Unit 10, which was based on creating a storyboard for the water cycle process, I was very scared as I am very bad in drawings. I was wondering how I would complete that work. Luckily, I devoted my time in reading the sample work on the volcano and worked really hard to make my drawings understandable as this work has been assessed in the clarity and the text based script. I firmly believed that this particular activity has been the most difficult one compared to the other activities.

With unit 10, the creation of the storyboard, I felt as if I was a filmmaker. However this unit was quite demanding. The script writing was quite easy, I liked it. But it required much time to do the several screens, the drawings, coloring, and explanation and to scan everything. Nevertheless, as the other units, the storyboard was also a very interesting one. It was something new for me. I must point out that all the instructions to carry out the tasks were very clear and this helped me a lot.

For this unit I understood mostly everything. I did every single things starting with the story and ending with the script writing. The thing I did not want to do is the paintings that

are needed for the storyboard. This is the only thing that I always avoid as I sometimes fail, if not always, in art and design in secondary school. So I had to ask a friend of mine to do the paintings. This unit confirmed that I will never be able to become good at painting and I do not have the creativity required to make a good story.

Jonassen (1991, 1994) had identified a set of design principles that can be applied to design constructivist learning systems. Among those that were applied in the case-study above are

- *Learning should be internally controlled and mediated by the learner*
From the students' comments it was obvious that learners had control over their learning and that it was an individual experience different for each learner.
- *Focus on realistic approaches to solving real-world problems*
Both the learning activity design and the approaches used as described by the students focused on realistic and to some extent creative approaches. As one student pointed out, he or she had recourse to a third-party to do part of the work which he or she did not like. Although in the context of the activity it would have been advisable that the whole of the activity be carried out by the student, this act was a real-world example of things that happen in reality.
- *Foster reflective practice*
The learning journal is an efficient and effective tool to foster critical reflection on their own learning and to think aloud about what could be improved. Guiding the reflection through structured questions provide better quality responses and sound clues and hints of where improvement can be brought.
- *Present authentic tasks (contextualizing rather than abstracting instruction) and enable context- and content dependent knowledge construction*
The storyboarding activity is an example of authentic task where students learn by example and then apply the skills in a different scenario. By exposing them to the techniques of storyboarding, examples of existing storyboards and then asking them to draw a storyboard of an existing animation is an example of context and content dependent knowledge construction.
- *Support collaborative construction of knowledge through social negotiation*
Discussion forums have been extensively used in this course where students have mainly been interacting among themselves to provide peer-support during the activity. It has also been reported in the students' reflection that they used a Facebook group to share concerns and relevant ideas and information regarding the different learning activities that they were engaged into.

Conclusion

In this article, we demonstrate how three different e-learning methodologies namely the e-book approach, rapid e-learning techniques, and online activity-based instructional design can be federated to create a high quality learning environment based on socio-constructivist learning principles. Those three methodologies have been mainly used in isolation and it seemed for long in literature that they were clearly being distinguished from and seemed mutually exclusive from each other. The case-study on storyboarding in this article provides a working example of the three methodologies in a contextualised situation. It is clear that this approach provides a new dimension to the conception of online distance learning courses where the criticism of such environments lacking the focus on the educational transaction is addressed.

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