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at the 2013 and 2014 EDEN Annual Conferences

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András Szűcs, Ulrich Bernath

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Introduction

Research in open, distance and e-learning is indispensable to provide information for development and decision-making, while it also enhances the quality of products and services.

One of the core missions of EDEN has been to support the exchange of academic and professional experience, to promote navigation and information reach on the rapidly evolving scene. Since 1992 we organise European conferences for open, distance and e-learning annually. These professional gatherings are major events in Europe, attracting considerable interest from other continents as well. They help to consolidate knowledge and build the international community of professionals.

The Best Research Paper Award, acknowledging the excellence of the EDEN conferences' best contributions, was launched in 2008. The selection process is supported by the **Ulrich Bernath Foundation** for Research in Open and Distance Learning and controlled by a prestigious Jury.

The finalists of the Best Research Paper Competition at the EDEN 2013 Annual Conference in Oslo and 2014 in Zagreb have been invited to further elaborate their contributions for a special printed volume – the **present EURODL selection** contains these papers.

The **Oslo Conference** entitled “The Joy of Learning” targeted e-learning, open and distance education as important fields of intellectual excitement and innovative development, creative methods and smart solutions. In Europe, there has been a collective drive towards individual and collective motivation and overall improvement of learning quality. The smart use of ICT offers a wide range of tools, new methodologies for enhanced learning experience, content management systems and fascinating inter-disciplinary solutions supported by e.g. game based learning, immersive environments and multimedia.

The approach of the **Zagreb Conference** “From Education to Employment and Meaningful Work with ICTs” was based on the criticism of European education and training systems often not well responding to social needs. E-learning, as a system integrator, may help education providers and employers to actively step into one another's worlds.

Among the goals of the European Strategy for smart, sustainable and inclusive growth, Europe 2020, we find employment and innovation, featuring education as a major lever. E-learning has become an acknowledged delivery method in learning settings at work across various sectors and a wide range of company sizes. This is thanks to its acknowledged flexibility, cost and time efficiency, helping to develop new work habits and improved working climate, advanced organisational performance and staff commitment.

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Eliciting Students' Voices through Screencast-Assisted "Feedback on Feedback"

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Best Research Paper Award Winner

Abstract

Despite its obvious importance, research has suggested that students do not always engage with their tutors' assignment feedback. This paper focuses on a new approach to examining student responses to feedback received. 10 distance students of Spanish from beginner to advanced level articulated their responses to feedback obtained from their tutor on a particular written assignment using student-generated screencast (Jing) recordings. The recordings were then analysed for cognitive, metacognitive and affective elements. The study demonstrated that motivated students engage with tutor feedback and make active efforts to integrate it into their learning, although sometimes their responses are ineffective, with incorrect tutor assumptions about an individual student's abilities or assumptions leading to unsuccessful feedback dialogue. The findings indicate that this approach could constitute a valuable contribution to enhancing student-tutor dialogue in distance language learning assessment, which would merit further research.

Abstract in Spanish

Pese a su importancia, el feedback de los profesores no siempre es tomado en cuenta por los estudiantes. Este artículo se centra en una nueva técnica para investigar cómo responden éstos al feedback que reciben. 10 estudiantes matriculados en cursos de español a distancia de niveles principiante a avanzado verbalizaron sus respuestas al feedback de sus profesores sobre una tarea escrita y las grabaron en forma de screencast (Jing). Dichas grabaciones se analizaron con relación a elementos cognitivos, metacognitivos y afectivos. El estudio demuestra que los estudiantes motivados se involucran con el feedback de sus profesores y se esfuerzan activamente por integrarlo en su aprendizaje. No obstante sus respuestas no siempre surten efecto, y las asunciones incorrectas de los profesores sobre las habilidades de sus estudiantes pueden llevar a un

fracaso del diálogo de aprendizaje. Concluimos que esta técnica puede contribuir a mejorar el diálogo entre profesores y estudiantes de educación a distancia sobre la evaluación del aprendizaje, y constituye una valiosa herramienta para futuras investigaciones.

Keywords: feedback, assessment, student engagement, distance education, screencast, languages

Background

Effective feedback not only enriches the learning experience, but is essential to successful learning (Hurd, 2000, 2006; Ramsden, 2003; White, 2003), yet the results of the UK National Student Survey (Times Higher Education, 2014) show that feedback remains an ongoing challenge for HE institutions in terms of student satisfaction.

Even assuming that the quality of assignment feedback is excellent in its content and timing, it can only be effective provided that learners engage with it (Nicol, 2010; Black & Wiliam, 1998). However research has shown that learners do not always engage with the feedback provided. In an earlier study Furnborough and Truman (2009) identified three patterns of student engagement with external feedback amongst distance learners studying languages at beginner level: Group A saw feedback as a learning tool which *empowered* them to take on more responsibility for their own learning, Group B primarily related it with a sense of achievement (e.g. good grades), and Group C did not value assignment feedback and seemed either unable or unwilling to take their tutor's comments on board because of doubts or anxieties about their own performance.

So given that feedback is such a potentially valuable tool for effective learning, why would those students fail to engage with assignment feedback or feel dissatisfied with it? A common problem is that there is often a mismatch between the students' needs and expectations on the one hand, and the tutors' assumptions and practices on the other (Orsmond & Merry, 2011; Furnborough & Fernández-Toro, forthcoming).

Another line of research relates to the use of IT to improve the quality and effectiveness of assignment feedback. Many educational institutions have adopted electronic assignment management systems that improve the timeliness of feedback and the consistency of record keeping. Feedback can also be delivered through a variety of electronic media, which are especially useful in distance education. For example in the UK, the Open University routinely uses e-feedback in the form of standard templates for electronic reports (internally known as *PT3 forms*), annotations

on student's scripts using Word markup, and audio-recorded feedback. Certain tutors also give additional feedback by inserting links to screencast recordings in their written feedback.

The e-Feedback evaluation project

The aim of this project was to evaluate the use of spoken and written e-feedback in a context in which these modes of delivery had been adopted by a Higher Education institution across an entire subject area. One such context is the Open University, where the use of both audio-recorded and written feedback has been standard practice at the Department of Languages for a number of years. The evaluation looked at staff and student perceptions of assignment feedback, the quality of feedback itself, and student engagement with the feedback.

More specifically, the project aimed to evaluate:

- the students' and tutors' attitudes to assignment feedback in each of the media commonly used at the OU;
- the quality of feedback in three of the media used in terms of the criteria being assessed and the depth of feedback on strengths and weaknesses;
- the effectiveness of feedback in terms of student engagement and response.

These three evaluation strands were respectively evaluated by means of staff (N = 96) and student (N = 736) surveys; qualitative analysis of tutor feedback on 200 language assignments; and talk-aloud protocols consisting of screencast recordings in which students (N = 10) talked through the feedback written by their tutors on one of their assignments, or in other words, gave feedback on the feedback. This paper will focus on the latter strand, hereafter referred to as the 'feedback on feedback' (F/F) study.

Feedback on feedback

The F/F study was designed as a follow-up to the staff and student surveys and the analysis of tutor feedback. The aim of the study was to elicit and evaluate the students' cognitive, metacognitive and affective responses to their tutor's feedback. In analysing the recordings, special attention was given to the attitudes and perceptions reported in the surveys, as well as the features of tutor feedback that had been identified in the feedback analysis study. For reasons of space, the results of those two studies cannot be reported here, but relevant findings will be reported in the discussion section as appropriate.

Subjects

Participants in the study were adult university students studying distance learning modules in Spanish at the Open University. Out of the 736 language students who took the student survey, the 210 who were taking Spanish modules were invited to participate in the follow-up study. 88 of these agreed to be contacted and were sent an overall description of the study. Twenty of them subsequently requested the necessary instructions to produce the recordings. The final sample consisted of 10 students, who were the only ones to return a set of recordings. Such a high dropout rate was expected given the voluntary nature of the task, the challenge of trying out a new technological tool, and the fact that these were adult distance learners who had just completed their respective modules. As a result, the sample is not entirely representative of the student population as a whole, but of a highly motivated, high-achieving minority. Indeed, their marks on the assignment used all ranged between 75% and 94%, and this was taken into consideration when interpreting the data. All the levels taught at the OU were represented in the sample, which consisted of two students taking the beginner module, two from the lower intermediate module, four from the upper intermediate, and two from the advanced module. The sample comprised 5 males and 5 females. Three of the female students were not English native speakers and the remaining students were English native speakers. All were fluent enough to study a final year degree module in the UK and had no difficulty expressing themselves in English.

Method

Students were given a written set of instructions and a screencast showing a simulated walkthrough recorded by one of the researchers. All the necessary material was available online. The recording tool used was Jing, which allows a maximum recording time of 5 minutes. Students were asked to produce two recordings each: one about their marked written script (TMA) and another one about the accompanying feedback summary form (PT3). Students were sent anonymised copies of these document files so that no personal details could be seen on their recordings. In their task brief, they were encouraged to talk us through the assignment feedback, covering any aspects that they considered relevant, such as their first reaction to the feedback, which comments they did or did not understand, which ones they found useful or not useful, what feelings different comments elicited, what use students made of the feedback, and what they had learned from it. Once the recordings were completed, students submitted them by email. Thus, from the initial briefing to the final submission, the entire process took place electronically.

Each student's recordings were analysed in terms of their use of the two media (TMA script and PT3 form); their cognitive, affective and metacognitive responses to comments on strengths and comments on weaknesses; and their responses to different depths of feedback relating to strengths and weaknesses of their work. The notion of depth, proposed by Brown and Glover (2006) refers to feedback that either indicates a weakness/strength (depth 1), corrects the error/describes the strength (depth 2), or gives an explanation (depth 3). Fernandez-Toro, Truman and Walker (2013) suggest an additional level for cases where errors or strengths are categorised, for example when tutors use codes to indicate the category to which an error belongs (e.g. gender agreement). Thus, the four depths considered in this analysis are:

1. Indicated;
2. Categorised/Described;
3. Corrected/Exemplified;
4. Explained.

A further category was added where some kind of future action to avoid an error or build on a strength is proposed. As the brief given to the students was fairly open, responses to different types of feedback could not be compared quantitatively. The next section therefore focuses on describing typical responses and proposes a framework for interpreting them.

Results

Students' reported strategy for using the feedback

All students reported looking at the PT3 form before the TMA script, and all started by looking at their mark. They were also generally enthusiastic about receiving an overview in the general feedback form. As for the script, one student admitted that she had not really looked at it much, whilst another reported that she normally sets it aside until she has enough time to work systematically through each comment on her script. Printing out the feedback is common practice, sometimes in parallel with the computer, as mark-up comments on Word can be easier to read on screen than on paper. Subsequent use of the feedback was reported in only three cases, normally for revision purposes before the final assessment. Although all students found the feedback useful and clear, one stated that she had not learnt much from it and would just continue doing the same as she had been doing in her assignment.

Students' responses to feedback on weaknesses

Where tutors annotated or commented on problem areas, a number of possible responses were observed:

- **Active integration:** Understands the information provided by the tutor and elaborates on it. For example, a correction is given and the student then adds a categorisation (e.g. “gender agreement”) or an explanation (“because *poblacion* is feminine”); or the tutor gives an error category (e.g. “verb form”) and the student then provides the correction (“I should have written *fueron*”).
- **Attempted integration:** Tries to elaborate on the feedback but produces an inaccurate/inappropriate interpretation (e.g. correcting the tense of a verb when the problem actually related to the meaning of the verb).
- **Informed acceptance:** Appears to understand the information provided in the feedback but does not elaborate on it (e.g. [looking at a spelling correction] “Oh yes, that was silly!”).
- **Uninformed acceptance:** Acknowledges the information provided by in the feedback but there is no evidence of understanding (e.g. [tutor rewrites a sentence] “yeah, that sounds better”).
- **Uncertainty:** Acknowledges lack of understanding (“Can’t understand why *aunque* is deleted here”).
- **Rejection:** Disagrees with the information provided by the tutor (“it does annoy me when she says I should have included more information when the word limit is so ridiculously low”).
- **Evaluation:** Evaluates the error, either by explaining what caused it (e.g. Russian student says “past tenses are different in Russian”) or by voicing an evaluative judgement about their performance (“silly mistake”).
- **Planning:** Proposes some kind of action to improve performance (“I must revise prepositions”).

In any of these responses, cognitive and affective elements may be present in varying degrees. The first three are more cognitively oriented. Uninformed acceptance is also cognitively oriented, although it may reflect an underlying avoidance strategy rooted in affective factors such as fear of challenge. Conversely, rejection often has a clear affective component while its roots may be cognitive (e.g. feeling that a correction is unfair because you do not understand it). Evaluation and planning are mostly metacognitive, but again may be related to affect, for example in face-saving judgements such as “silly mistake” or giving reasons for errors in an attempt to justify them.

Students' responses to feedback on strengths

Cognitive, affective and metacognitive elements were also present in the students' responses to feedback related to the strengths of their work, though the most evident aspect was the affective response:

- **Appreciation of effort recognition:** Student is pleased to see his/her efforts acknowledged in the feedback (“It was quite difficult but you see my tutor says *well done*”; “Two ticks for my quotation at the end! I like that quotation and I am very pleased that my tutor liked it.”). This was the most common response to feedback on strengths.
- **Appreciation of personal rapport:** Student feels that the feedback treats him/her as an individual (e.g. personal greetings).

Cognitive and metacognitive responses generally mirrored those elicited by feedback on weaknesses, although some response types were less apparent for feedback on strengths:

- **Active integration:** e.g. tutor says “good introduction” (Depth 2: strength categorised) and student adds that she made sure to include “the mandatory quote” in her introduction (Depth 4: strength explained).
- **Attempted integration:** A correction may be interpreted as praise (e.g. tutor says “you exceeded the word limit” and student then explains that she always worries that she will not be able to write so much “but you see I exceeded that!”).
- **Informed acceptance:** e.g. “Good. I got that one”.
- **Planning:** e.g. “She tells me my referencing system is correct so if I use that in my final assessment I’ll be ok”.

Not too surprisingly, no examples of rejection were found in response to feedback on strengths, though previous research has shown that these can occur in certain cases (Fernandez-Toro, Truman & Walker, 2013). Explicit evaluations were also difficult to pinpoint as they were generally blended with planning, integration and affective responses.

Depth of feedback

For reasons of space, only the most indicative responses to different depths of feedback have been summarised in this paper. In the case of feedback on weaknesses, the determining factor for students' responses was whether tutors had provided enough information to elicit active integration or informed acceptance. Feedback on ‘basic’

mistakes such as spelling and gender agreement did not generally require a correction or an explanation in order to do so; whereas feedback on syntax and lexical errors could more easily result in failed attempts at integration, uninformed acceptance or rejection unless a suitable explanation was provided. The two advanced students who attempted to use vocabulary in a metaphorical way failed to understand why the tutor had corrected the words that they chose and rejected the corrections as “patronising” or repressive: “metaphors have been obliterated by the tutor [...] another image that was not appreciated or completely wrong, but it’s not clear. It’s a shame that at level 3 we are not allowed to explore”. In other cases, students just accepted syntax corrections that they did not understand: “I can accept that but I would probably make that mistake again in the future”.

In the case of feedback on strengths, it is worth noting that tutors’ comments including explanations (depth 4) or specific examples drawn from the student’s work (depth 3) are extremely rare in the sample. Comments that simply say that the work is good (depth 1) normally elicit positive affective responses related to effort recognition and personal rapport with the tutor. Ticks elicit similar responses. However, high achievers may find that acknowledging the good quality of their work (for example by giving a high mark) is not sufficient: “I gained pleasing scores of 90%, and again what would I have had to do to achieve 100%?”. Where present in the feedback, examples (depth 3) are welcome: ‘I like the fact that she gives me specific examples of connectors that I’ve used’. However only one such comment at depth 3 was found in the sample, and no further depth was used by tutors in comments relating to strengths.

Discussion

The responses described above could be grouped into two categories: The first group are responses that indicate that an effective learning dialogue is taking place through the process of giving and receiving feedback, both between tutor and student and within the student him/herself. The second group are responses that indicate either that such a dialogue is not taking place at all, or that somewhere in the process communication is breaking down. Effective feedback dialogue elicits knowledge construction (Nicol, 2012), promotes a positive perception of oneself (Nicol & Macfarlane-Dick, 2006), sustains motivation (Dörnyei, 2001; Walker & Symons, 1997), and promotes autonomous learning (Andrade & Bunker, 2009; Truman, 2008). Conversely, ineffective feedback dialogue does not result in knowledge construction, challenges the self, is demotivating and fails to promote learner autonomy. Table 1

summarises the responses that are deemed to indicate effective and ineffective feedback dialogue.

Table 1: Students' responses indicating effective and ineffective feedback dialogue

	Effective feedback dialogue	Ineffective feedback dialogue
Cognitive responses	Active integration	Attempted integration
	Informed acceptance	Uninformed acceptance Rejection
	Uncertainty that elicits focused planning	Uncertainty that does not elicit focused planning
Affective responses	Personal rapport	Lack of acknowledgement of the student as individual
	Effort recognition	Effort not recognised
Metacognitive responses	Evaluation coupled with positive emotion and active integration	Evaluation coupled with negative emotion
	Planning that focuses on relevant areas	Lack of planning, or planning that does not focus on relevant areas

As explained above, the participants in this study were highly motivated students, and therefore it would be reasonable to expect a considerable number of responses indicating that effective feedback dialogue was taking place. Indeed, cognitive responses to feedback on weaknesses, especially those related to what students regarded as “silly mistakes” (spelling, agreement, missing references, etc.), tended to result in the construction of knowledge through active integration or informed acceptance. Positive affective responses to feedback on strengths, especially to perceived personal rapport (“she spotted I am French, well done tutor”, pleased to be singled out to receive feedback in Spanish, etc.) and effort recognition were also very common, as were metacognitive responses in the form of planning strategies to improve future performance.

However, somewhat unexpectedly in a group as motivated and high-achieving as this, a number of responses indicating ineffective feedback dialogue were also found alongside these constructive responses. Unhelpful cognitive responses such as uninformed acceptance or attempted integration tended to occur with feedback on errors related to more complex structures, such as syntax corrections that were left unexplained [i.e. depth 3 with no coverage of depth 4]. At more advanced levels, unexplained lexical corrections were perceived by students as the tutor's failure to appreciate their creative attempts at experimenting with the language through the use of metaphors. This caused them to reject the feedback both on cognitive and affective grounds, as they felt that their personal efforts had not been appreciated. Well-

intended tutor support was also rejected when students suspected a one-size-fits-all approach that failed to take their individuality into account (e.g. lengthy technical tips given to a student who had worked for years in IT, cut-and-paste invitation to contact the tutor at the end of a feedback form, etc.).

The presence in the sample of responses indicating both effective and ineffective feedback dialogue is consistent with claims commonly voiced by tutors that their feedback, or at least some of it, often does not achieve its intended purpose. The roots of the communication breakdown may be cognitive, as in cases where the depth of feedback was not sufficient, or affective as when students felt that their efforts or individuality were not being duly acknowledged. The fact that even a highly motivated group of students such as the participants in this study occasionally failed to integrate tutor feedback suggests that this type of occurrence might be considerably more common in a sample including a wider range of abilities and motivational levels.

Conclusion

This study shows that highly motivated students do engage with tutor feedback and make active efforts to integrate it. However in some cases their cognitive, affective, or metacognitive responses to the feedback are ineffective. The previous discussion suggests that a tutor's incorrect assumptions about the student's abilities, expectations or attitudes in relation to feedback can contribute to these occasional breakdowns in communication. By giving students a voice, the *feedback on feedback* method used in the study encourages students to articulate their responses to the feedback and makes it possible to identify what comments result in successful or unsuccessful feedback dialogue. The present study has two limitations: Firstly the self-selected nature of the sample means that it does not represent the student population as a whole, and the study would need to be repeated with a randomly selected sample including less motivated and able students. Secondly, as the *feedback on feedback* exercise conducted here was intended for research purposes, the students were addressing the researchers rather than their tutors, thus missing out on a valuable opportunity for genuine feedback dialogue. Despite these limitations, the fact that recordings were submitted at all shows that the method is potentially viable and could be implemented as a means of promoting feedback dialogue between students and tutors, both in face-to-face and distance learning environments. Tutors could, for example, invite all their students to comment on their feedback after the first marked assessment on a course, or they could use the method in a targeted way whenever they suspect that a student is not learning from their feedback. The findings of this study also indicate that high

achievers would also benefit from the exercise and should be given the opportunity to make their voices heard.

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Seeking for the Added Value of Videogames and Simulations

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Abstract

Videogames and Simulations (V&S) are a hot topic in learning and education. A substantial amount of research and experiments had been done in the last ten years, which grows every month and every year. In this paper, I explore the field of V&S by focusing on its added value for learning. Building on the work of done by James Paul Gee and his colleagues at Wisconsin-Madison, by Donald Schön on reflective learning, by Fernando Flores and Martin Heidegger on learning from breakdowns, my intuition is that V&S are the best environments for reflective learning because they create breakdowns (*surprises*) very frequently, hence forcing players to reflect on and in action.

The paper describes a business simulation done at ESCP Europe Business School, in its Paris, London, Berlin and Madrid campuses, for Master in Management students. Data came from an evaluation questionnaire completed by all students that gives both quantitative and qualitative data. In addition to that, we have been able to access data by doing observation and participant observation. The results show that the added value of the simulation lies in learning by doing, competition (it's a *game*), and the discovery of ontological uncertainty in decision-making. Also, students practiced reflective learning, however encountering some limits when doing reflection-*in-action*.

Abstract in Spanish

Videojuegos y Simulaciones (V&S) son un hoy tema candente en la educación. Una cantidad importante de investigación y de experiencias se han realizado en los últimos 10 años, cantidad que crece cada mes y cada año. En este artículo exploro el dominio de los videojuegos y las simulaciones focalizando en su valor para la educación y el aprendizaje. Construyendo a partir de los trabajos realizados por James Paul Gee y sus colegas en la Universidad de Wisconsin-Madison, por Donald Schön en aprendizaje reflexivo, por Fernando Flores y Martin Heidegger en el aprendizaje a partir de *quiebres* (breakdowns), mi intuición es que los videojuegos y las simulaciones son los mejores ambientes para el

aprendizaje reflexivo porque crean quiebres (*sorpresas*) muy frecuentemente, forzando por lo tanto a los jugadores a reflexionar sobre, y en, la acción.

El artículo describe una simulación de negocios hecha en ESCP Europe Business School, en sus campus de Paris, Londres, Berlín y Madrid, para los estudiantes de su Master in Management. Los datos provienen de un cuestionario de evaluación completado por todos los estudiantes, cuestionario que entrega datos cuantitativos y cualitativos. Además, pudimos acceder a otros datos a partir de la observación directa y la observación participante. Los resultados muestran que el valor de la simulación reside en el *aprender haciendo*, la competencia entre los estudiantes (*es un juego*), y el descubrimiento de la incertidumbre ontológica propia al proceso de toma de decisiones. Los estudiantes practicaron el aprendizaje reflexivo, encontrando sin embargo algunos límites al practicar la reflexión-en-acción.

Abstract in French

Les jeux vidéo et les simulations sont un sujet abondamment discuté dans l'éducation d'aujourd'hui. Une quantité significative de recherche et d'expériences a été faite lors de ces dix dernières années, quantité qui croît tous les ans. Dans cet article j'explore le domaine des jeux vidéo et des simulations en focalisant sur leur valeur ajoutée pour l'enseignement et l'apprentissage. En partant des travaux réalisés par James Paul Gee et ses collègues à l'Université de Wisconsin-Madison, ceux de Donald Schön sur l'apprentissage réflexif, et ceux de Fernando Flores et Martin Heidegger sur l'apprentissage à partir de *surprises* (breakdowns), mon intuition est que les jeux vidéo et les simulations sont les meilleurs environnements pour l'apprentissage réflexif car ils créent des *surprises* très fréquemment, en forçant partant les joueurs à réfléchir sur, et dans, l'action.

Cet article décrit une simulation d'affaires à ESCP Europe Business School, dans ses campus de Paris, Londres, Berlin et Madrid, pour des étudiants du Master in Management. Les données viennent tout d'abord d'un questionnaire d'évaluation rempli par tous les étudiants, questionnaire qui fournit des données quantitatives et qualitatives. En outre, nous avons pu accéder à d'autres données à partir de l'observation directe et de l'observation participante. Les résultats montrent que la valeur ajoutée de la simulation réside dans l'apprendre en faisant, la compétition entre les étudiants (*c'est un jeu*), et dans la découverte de l'incertitude ontologique propre à la prise de décision. Les étudiants on

fait un apprentissage réflexif, avec toutefois des limites concernant la réflexion-en-action.

Keywords: videogames, simulations, learning by doing, reflective learning, reflection-in-action

Introduction

In recent years videogames and simulations (V&S) became a fast growing sector in education. During the last decade, many experiments were made with V&S in education and their number is growing from year to year.

There are essentially two types of experiences with V&S in education:

- Exploit existing products to highlight some fundamental mechanisms;
- Develop products specifically for educational purposes (sometimes called *serious games*).

For instance, in the first type, a social simulation game like *The Sims* allow gamers to understand political and economic principles and, especially, the complexity of these mechanisms. *Spore*, a simulation game in the field of Biology is a very good tool for the understanding of some aspects of natural selection. More sophisticated, scholars and management development professionals are using *World of Warcraft* for the learning of leadership skills (Denning et al., 2011; Thomas & Brown, 2009; Thomas & Brown, 2007). A first example of the second type is *Supercharged*, a simulation game whose purpose is the handling of the trajectory of a spacecraft (which is in fact a “particle”) managed by manipulating electrical charges. Nowadays there are thousands and thousands of simulations and videogames especially designed for educational purposes.

In this paper we will explore the field of V&S by focusing on its added value for learning. In other words, our research question is: *What can be learnt with V&S that cannot be learnt (or poorly) with other pedagogical tools or techniques (such as case studies, role playing, problem-based learning, etc.)?* The paper starts by describing the main ideas on V&S and Learning, focusing on our intuition that V&S are a privileged tool for reflective learning. Then the paper will describe an experiment: *The 21st Century Car Challenge*, a business simulation implemented at ESCP Europe Business School.

Videogames, simulations, and learning

The recent interest on V&S for learning can be rooted to the work of Mark Prensky at the beginning of this century (Prensky, 2001). Prensky – who invented the terms *Digital Immigrant* and *Digital native* – said that there are five levels of learning with games: How, What, Why, Where, and When/Whether. First level (How) relates to game control, e.g. where to click in order to build a certain kind of buildings in a town (like in Sim City, Age of Empires, or Civilization). At the second level (What) the player incorporates the rules of the game, i.e. what can (or cannot) be done. Interestingly, in V&S the rules are incorporated while playing the game, not before, which is usually the case in board games. At the third level (Why) the player learn the strategies needed to win the game. The fourth level (Where) is related to the environment of the game, where the player is totally immersed. Finally, at the last level (When/Whether) the player must make some choices, make decisions, take action and get feedback. It is at this fifth level where the player discovers and understands the reward system of the game.

However, we think that the most interesting quest on V&S and Learning started with the investigation done by James Paul Gee at Wisconsin-Madison University. His research program starts with the finding that many people (especially young people) are willing to spend many hours doing hard, long and complex activities, i.e. playing sophisticated videogames, and they enjoy it. Why these people don't spend so many hours doing other "hard, long and complex activities" such as mathematics, physics, biology, history, literature, etc.? What is in videogames that people love so much? Are there underlying learning principles embedded in games that teachers should apply in the design of their courses? Jim Gee's investigation is aimed at answering those questions.

In his seminal book *What videogames have to teach us about Learning and Literacy* (2007), Gee found 36 learning principles embedded in "good" videogames. We will not describe here all of those principles, we're just going to select some of them that we find especially interesting for our research.

- Identity. In V&S players take a new identity, one that matters to them. Within this identity they become committed to the virtual world where they will live and act.
- Practice. Players get a lot of practice in a context where practice is not *boring*. They spend a lot of time performing tasks.

- Interaction. In V&S, nothing happens until players act and make decisions. Moreover, V&S do talk back, giving the player feedback and new problems.
- Risk Taking. V&S lower the consequences of failure. Therefore, players are encouraged to take risks, explore, and try new things.
- Well-Ordered Problems. In good V&S problems are organized in *levels*, so that the earlier ones have a lower level of difficulty and are built in a way that their solutions are the basis for solving the later, harder problems.
- Help is *Just in Time* and/or *On Demand*. Content, that one usually finds in textbooks or in teachers' talks, is usually delivered out of context, and students cannot tie it to experience; this is why it is so inefficient. In good V&S information is given when players feels a need for it (e.g. when facing a failure), can use it and are ready to use it. Knowledge is there to be applied *immediately*.
- Performance before Competence. We think this concept, emphasized by Cazden (1981) and related to assistance to learner in Vygotsky's zone of proximal development, is one of the most powerful learning principles embedded in V&S. Players can perform (i.e. act) before they become competent. Supported by the design of the simulation or the videogame, the smart tools V&S offers to the player (help tools), and by other more advanced players, beginners can learn to play *while playing*.
- System Thinking. Games encourage players to think about relationships, not isolated events or facts. It is a main feature of V&S that players need to think on how each action taken might impact on future actions, their domain of actions, and/or on other players. In our complex and global world such system thinking is crucial for everyone.

Jim Gee suggests not only to use videogames and simulations in schools and colleges, but also to make learning more *game-like* in the sense of using these principles to design and develop courses and other learning techniques (Gee, 2008; Gee, 2009).

Other scholars who have done interesting contributions to the field are Eric Klopfer and David Williamson Shaffer. Klopfer, Director of the MIT Teacher Education Program, is well known for developing games for mobile platforms using augmented reality. Maybe the best example is *Environmental Detectives*, a game developed for students of Civil and Environmental Engineering at MIT. Students play in teams, every team has a different role (identity) and a goal: to investigate a serious pollution in Boston Area. But the way students play depends on their role: environmental NGO member, communication officer at the company responsible for the pollution, a

scientist at EPA (Environmental Protection Agency), etc. To play the game, students must go out of MIT buildings and visit different places in the Boston Area seeking for data and information. In order to do this, PDAs with a GPS device are available. For instance, if one team is directed to Charles River, when they arrive to the river they have to collect a sample of contaminated water. Here comes augmented reality. When the GPS detects that the team has reached the place where they must get the sample, the augmented reality makes a virtual experience and give the team the resulting data. In fact, teams must collaborate in order to propose a good solution to the pollution problem. Because this game was designed and developed 10 years ago, it has been implemented on PDAs, but today it could be implemented in smartphones and tablets (Klopfer, 2008).

David Williamson Shaffer is interested in the ways we can use V&S to introduce children and young people to the basic conceptual frameworks that govern various professional practices (Shaffer, 2008). Building on the work done by Donald Schön (Schön, 1983; Schön, 1987), Shaffer has developed a set of *epistemic games* aimed at help players learn to *think like* engineers, urban planners, journalists, lawyers, and other innovative professionals. Interestingly, Shaffer states that V&S are powerful tools for reflective learning, statement we share and develop showing that these ideas are consistent with Martin Heidegger's ones on *learning from breakdowns* (Vasquez Bronfman, 2008). All of this lead us to the following hypothesis related to our research question: "V&S are the best environments for reflective learning because they create breakdowns (*surprises*) very frequently, hence forcing players to reflect on and in action. In this sense, V&S can be referred as breakdown creation machines".

Finally, V&S can be linked to the seminal work of Seymour Papert on educational technologies. As a matter of fact, V&S are microworlds. Papert defined a microworld as a "subset of reality or constructed reality whose structure matches that of a cognitive mechanism so as to provide an environment where the latter can operate effectively" (Papert, 1980). Andy diSessa (a Papert pupil) also wrote: "... a microworld is a type of computational document aimed at embedding important ideas in a form that students can readily explore. The best microworlds have an easy to understand set of operations that students can use to engage tasks of value to them, and in doing so they come to understand powerful underlying principles. You might come to understand ecology, for example, by building your own little creatures that compete with and are dependent on each other" (diSessa, 2000). The link with V&S is obvious.

An experiment with V&S: The 21st Century Car Challenge

This is a simulation developed by Megalearning, a Brussels-based company. There are of course other business simulation products, such as the *Global Management Challenge* from Simuladores e Modelos des Gestao (SDG) in Lisbon (www.sdg.pt), CESIM (www.cesim.com), a Finland based company, and Industry Player (www.industryplayer.com). Students are split in *universes* of five teams, of 3 to 5 students each. The role of the students is to be the general management team of a car manufacturer multinational company and their goal is to win the competition against the other teams of their universe. There are four different product lines: Low Cost cars, Family cars, Eco-friendly cars, and Image cars. At the beginning of the simulation, all teams are in the same situation: 20% of the total market, etc. Teams are evaluated on six criteria that have the same weight: Revenues, EBIT (Earning Before Taxes and Insurance), ROCE (Return On Capital Employed), ARE (Accumulated Retained Earnings), Share Price, and Employee Morale. The simulation calculates all of these indicators.

The first task is to fill a table about customer sensitivities on different purchasing criteria such as design, robustness, technology, size, performance, consumption, advertising, etc. Then students download an Excel sheet where they must make decisions on these criteria for all lines of products. In addition to that they have also to make decisions on price, production capacity, investments in facilities and in Human Resources & Quality, etc. While preparing their decisions the systems give them feedback, so students can see the foreseeable consequences of their decisions (see Figure 1). When the decision is ready, students upload it to the server.

Once every team has uploaded its decision, the professor in charge for the universe runs the simulation. The system gives then the results of the first round of the simulation.

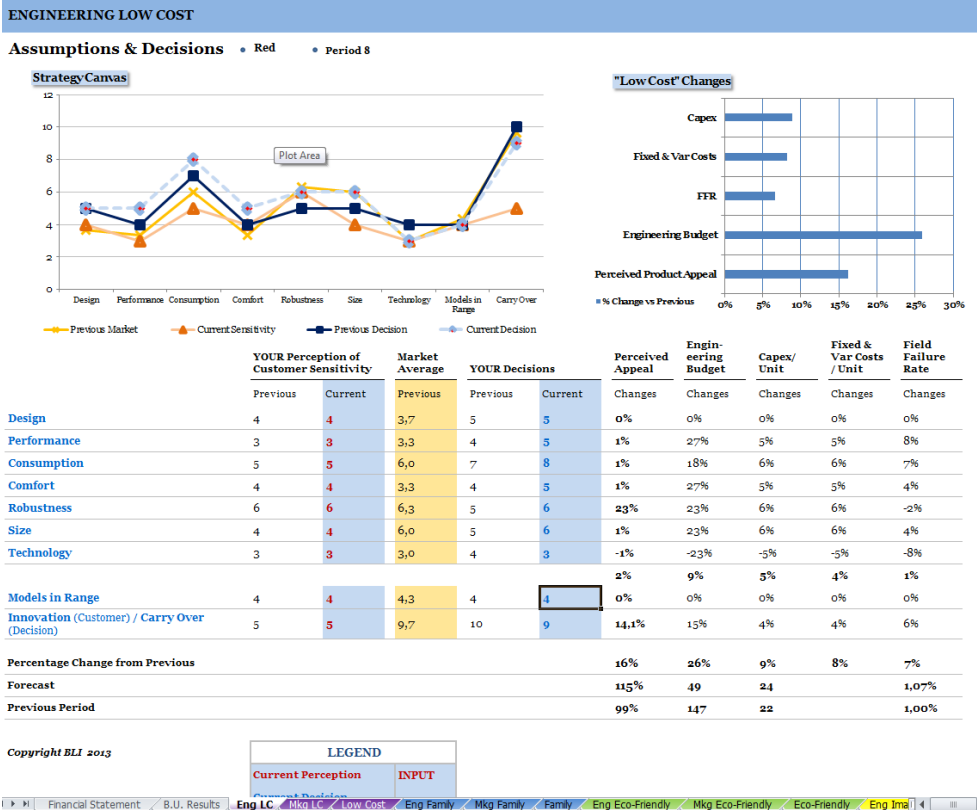


Figure 1. A screenshot of the Excel sheet

At ESCP Europe Business School we have been running this simulation since January 2010, especially for students in our MiM (Master in Management) Program. Every year we have almost 400 students in our Paris campus that we divide in two streams, and in every stream we have 7 or 8 universes. This simulation has also been running in our London, Berlin, and Madrid campuses. Evaluation surveys in these campuses are consistent with our findings at Paris campus. Every universe has a professor who acts as a coach for this universe teams. The simulation lasts for 3 days, where students have to make 7 decision rounds. Professors coach the teams helping them to analyse the results of their decisions and giving them documentation with data on their results and on their competition, which allow teams to build scorecards and analyse their competitors' strategy. As the simulation progress, it becomes more complex. For instance in Day 2 there is a merger with a manufacturer of an emerging country (China, India, Brazil, etc.). Therefore, decisions should be taken for two different markets with different characteristics, production can be outsourced to the emerging country (but this have a negative impact on employee morale), etc.

Based on our main research question (What is the added value of V&S for learning?) we have done an exploratory study using *The 21st Century Car Challenge* as fieldwork for this research. We started this inquiry with the following questions in mind:

- What did students like?
- What did students learn?
- What did students learn better than with other techniques (e.g. case studies, etc.)?
- Did students practice reflection?

At the end of the simulation, all of the students must complete an evaluation questionnaire that gives both quantitative and qualitative data. In addition to that, we have been able to access data by doing observation and participant observation. The author of this paper is also a professor who coaches simulation teams. On the other hand we have hired a researcher and some students doing their MiM Thesis in order to have an external point of view. This protocol has been implemented during three years.

Clearly, students love to play this simulation/game. What they like most is that “it is close to reality”, the experience of doing teamwork, and the competition (they don’t play against the machine, they play against other teams). Students learnt to apply general knowledge to particular situations, especially strategy and competitive advantage analysis, financial statements analysis, marketing mix, operations management, and KPIs (Key Performance Indicators).

What students learnt better than with other techniques? First, the *systemic nature* of companies: there are relationships between financial ratios; there are relationships between functions (the decisions you make when designing a car have an impact on production costs, hence in price, etc.); in other words there are always a multitude of factors to take into account. Second, students experienced the fact that the decision-making process is always done in *uncertainty* (“You can’t know what other teams will do”, “The situation is changing all the time”, etc.). Finally, we observed that students practiced *bricolage*, informed improvisation, trial and error.

Did students practice reflective learning? Our intuition is that V&S allow the practice of reflection, in particular *reflection-in-action*, because during the videogame and the simulation, one is always facing surprises, breakdowns, unexpected results... and must take action, often immediate action. Our findings show that almost all students practiced reflection-*on-action* when discussing the results after a simulation round

and when discussing their views during the decision process (because of the system's feedback), but only some students sometimes practiced reflection-*in-action* when preparing their decisions because of the system's feedback, the trial and error process, etc.

Conclusions

The experiment of *The 21st Century Car Challenge* confirms that V&S have at least some of James Paul Gee's learning principles. As a matter of fact, students took an identity (the general management of a car manufacturer company), had a lot of practice making decisions, interacted almost all the time with the simulation, and they have taken risks. Also, students faced well-ordered problems of increasing complexity and got *just in time* help (delivered mainly by the professors), and learnt system thinking. Finally, performance before competence was the rule.

However, it is important to state the limits of management learning within this simulation. In his book *Managing* (2009), the well known management thinker Henry Mintzberg says that there are three levels of management: at a first level people take action; at a second level, managers motivate and organize people to take action; and finally, at a third level, managers take decisions based on data and information. In *The 21st Century Car Challenge* students manage only at this third level. This is a key learning point that professors should emphasize: in this simulation, there is no change management.

Finally, concerning our research question, we believe that the added value of V&S for learning can be hypothesized as follows:

- V&S are *breakdown creators*, hence forcing players to reflect in and on action;
- In V&S players experiment that decision-making is always at risk, because decision it's done in uncertainty;
- In V&S players experiment the systemic nature of organizations, hence allowing for system thinking.

Last but not least, in all of this learning players have fun (in particular "hard fun").

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Interaction Equivalency in the OER and Informal Learning Era

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Abstract

In this theoretical paper, we overview the application of the Anderson's 2003 Interaction Equivalency Theorem (the EQiv) to the development and student use of formal online learning. The EQiv theorem explains how the effective use of OERs, MOOCs and net-based video can be used to enhance institutional-created content at low cost and high efficiency.

Abstract in Japanese

本論文は、
正規教育におけるオンライン学習の発達および学習者による使用状況を、
テリー・アンダーソンが 2003
年に提唱したインタアクション等価説 (Interaction Equivalency Theorem: 通称 the Equiv) を用いて概観する。Equivにより、
教育機関が作成する教育コンテンツを OERs (Open Educational Resources: オープン教育リソース), MOOCs (Massive Open Online Courses: ムークス),
そしてインターネット配信ビデオを活用しいかに安価かつ効率よく効果的に強化できるかを説明する。

Key Words: EQiv, Interaction Equivalency Theory, OERs, MOOCs

Introduction

This paper aims to clarify issues and challenges that the field of education has encountered in the context of OER (Open Educational Resources) and increased emphasis on informal learning (Eraut, 2004). It is guided by insights from the Interaction Equivalency Theorem (the EQiv) posited by the second author (Anderson, 2003). In the paper, we first provide an overview of the core concepts of the EQiv. Next, we explain how the EQiv framework can be used to analyze

interaction designs for online and distance education. Furthermore, relying on the functionality of the EQuiv, the paper examines the major challenges and opportunities formal education is confronting due to the ever-growing availability of OER and informal learning opportunities they create (Anderson & McGeal, 2012). In conclusion, this paper explores the changing role of formal education in the new era of learning where large quantities of online educational resources and opportunities are readily accessible and in many cases completely free of cost to the learner.

Interaction equivalency theorem

Definitions and concepts

The Interaction Equivalency Theorem (the EQuiv) was originally posited by Anderson (2003). In this paper the definition of interaction provided by Wagner (1994) is used, which is the one Anderson adapted to develop his interaction arguments. That is, interactions are “reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence each other” (p. 8).

Historically, the *Three Types of Interaction* model (Moore, 1989) was the first systematic use of interaction as a defining quality and characteristic of distance education. This model defines critical interaction in educational contexts as having three essential components: learner–content, learner–instructor, and learner–learner interaction. As an extension of Moore’s model, the EQuiv was created with the purpose of providing “a theoretical basis for judging the appropriate amounts of each of the various forms of possible interaction”. For a detailed history of interaction theory, please refer to Miyazoe (2012).

The main features of the EQuiv are condensed into two theses:

- Thesis 1. Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student–teacher; student–student; student–content) is at a high level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience.
- Thesis 2. High levels of more than one of these three modes will likely provide a more satisfying educational experience, although these experiences may not be as cost- or time-effective as less interactive learning sequences.

Interpretations of the EQuiv in various contexts have formed the basis of a number of research studies and student thesis. Many of these are linked at the Equivalency Theory site at <http://equivalencytheorem.info>.

In accordance with the EQUIV formulation, Anderson had expanded Moore’s interaction model to all possible six components: student–content, student–teacher, student–student interaction, plus teacher–content, teacher–teacher, and content–content interaction (Garrison & Anderson, 2003).

Figure 1 is an attempt to visualize the two EQUIV theses. The figure on the left represents Thesis 1 and its two main points: (a) in its extreme, a high level of one of the interactions (i.e., student–teacher, student–student, and student–content) is able to support insightful, meaningful formal learning, and (b) each interaction has the same value (equivalency = equal + value), which is denoted by using the equal sign. Additionally, the colored shading highlights the difference in the various intensity levels (high, middle, and low) of interactions: a deeper hue signifies a higher level of interaction intensity. The figure on the right represents Thesis 2, which is the following: more than one type of high-level interaction is desirable in order to increase learner satisfaction. The component of cost/time efficiency will be detailed in the next section.

It is important to emphasize that the main point of Thesis 1 is concerned with the effectiveness of learning (that is, the qualitative aspect of the educational interaction). By contrast, Thesis 2 is concerned with learner satisfaction and cost/time efficiency (quantitative). In addition, Terry Anderson originally meant for the cost/time concept to be applicable for both program providers (including institutions and tutors) and learners.

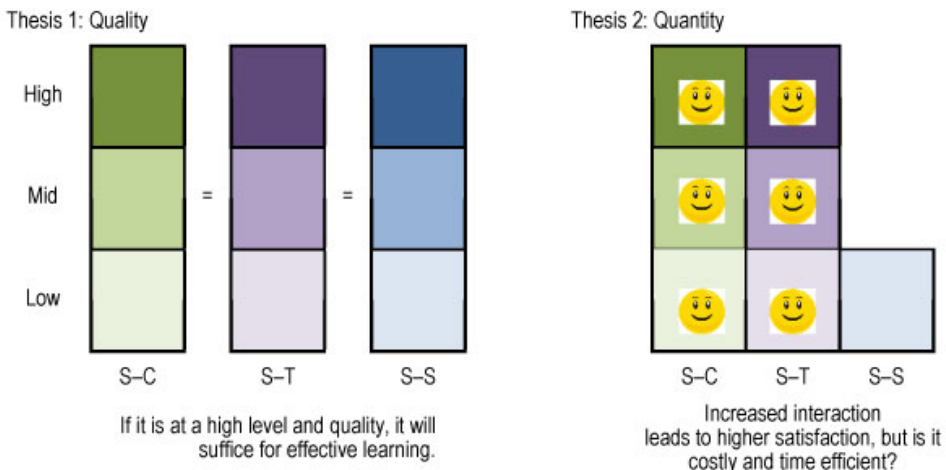


Figure 1. The EQIv Visualization

EQIv and cost/time issues

Interaction is expensive in any format and has time, financial and opportunity costs for learners, teachers and institutions. Instructional design refers to the entire process of achieving educational outcomes (Siemens, 2002) and thus includes consideration of interaction costs. By contrast, interaction design (ID) is focused on the specific course/curriculum design for learning. When we plan for an increased amount of interaction in an educational course (for example, a higher frequency of Q&A between teacher and students using an online forum or a higher frequency of socialization among students using social networking space), additional cost/time is required.

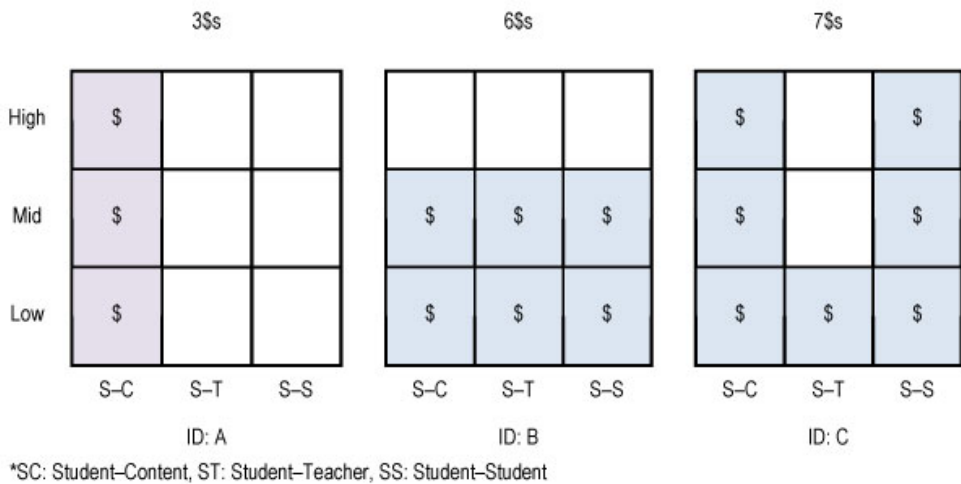


Figure 2. Cost/Time Issues in Interaction Design

In Figure 2, let us suppose that ID: A is the most efficient design (it has achieved the highest level of learning with the least cost/time), and ID: C is equally effective (it achieves the same high level of learning) and satisfactory (due to the variation of high-level interaction) for a specific purpose in a particular context. In many cases, the ID used could be ID: B, in which a moderate level of all the three interactions is implemented with the hope that the ID will satisfy the needs and expectations of the highest number of stakeholders. It is important that the EQIv considers that the optimal ID will likely be different, depending on numerous variables in a specific context (Miyazoe & Anderson, 2010; Miyazoe & Anderson, 2012). However, ID: B and C could be less desirable if both effectiveness and efficiency are demanded.

The EQuiv in the contexts of OER and informal learning

We noted the effect of OER and informal learning potentials in the EQuiv when we discussed closed versus open systems in educational resource provisions:

“The conceptualization of the theorem clarifies further dimensions that need to be considered in the interaction design. One of these dimensions is the diversity of educational delivery contexts (i.e., closed vs. open systems). In a closed system, due to the limitations of cost and other resources, the designer may have to choose which possible interaction is the most important. In an open system, positive and accidental interaction Thus (e.g., a course teacher voluntarily adding new online resources or a student enhancing learner-interaction through watching Kahn Academy videos) to enhance the course) are possible. The cost and time issues are relative to the system chosen as the framework of the course design” (Miyazoe & Anderson, 2011, p.2).

These interaction surpluses are educational examples of new affordances that authors such as Clay Shirkey refer to as cognitive surplus or Brynjolfsson and McAfee (2014) call a *bounty*. They provide more tangible goods, digital products and services all at lower and lower price. The availability of the ever-growing OER and informal learning opportunities relate to this *opening* of the traditional education systems, which notes the *accidental interaction surpluses* are increasingly important variables to be taken into the formal educational curricula and systems. Educational institutions are becoming networks of information and knowledge aggregation where partially open educational systems are digitally connected to each other. The Modes of Interaction model posited by Garrison and Anderson (2003) is useful to analyze the various types of learners with the new OER and informal opportunities alongside formal learning:

- Student–Content: Increasingly, students are being asked and challenged to both find and create content and to share this as OERs that can enhance and augment the content supplied by the course creators.
- Student–Teacher: Students gain a teacher-like presence from various sources (recordings of other teachers, MOOCs, etc.) other than the formal teacher even though the issue of responsibility, morality, integrity, accuracy, bias etc. can be confusing to students.

- Student–Student: Numerous online platforms for socialization are available, and students can achieve a high-level of interaction among peers within and beyond those enrolled in the course in various ways outside of the formal curricula.
- Teacher–Content: Teachers (or course developers) are able to collaboratively create and use content through tools like Wikis and OERs that allow them to both create and use multiple types of content.
- Teacher–Teacher: Numerous online resources and platforms allow teachers to interact and learn within networked communities of practice and to assess and recommend content and activities among the set of distributed teachers (Dron & Anderson, 2014).
- Content–Content: With digital networks, content itself is potentially interactive and can be designed to update and augment other content thus growing prolifically beyond the formal/informal distinction.

The current issues and challenges that formal education systems have/will face amid expansion of OER and informal learning will next be examined using the EQuiv framework of learning outcomes (Thesis 1), learner satisfaction and cost/time issues (Thesis 2).

Learning outcomes

In current formal learning environment OER and informal learning opportunities abound. Students can rely on a high-level interaction of many kinds from various resources without major limitation. In this context, Thesis 1 remains valid because its primary focus is on quality; the difference in material location (inside/outside of school) and learning mode (formal and informal) are peripheral to the issue. This also signifies that quality learning can occur even if formal education fails to provide the necessary intensity of interaction as the learner knows he/she has opportunity to access external means to supplement to any expected or required level of interaction. For example, a student in a formal course may access content from iTunes University, a MOOC, Khan Academy, an international network of students studying in the discipline or an online forum of professional interaction. In this sense, the realization of quality learning has become more dependent on each learner's ability and their *network literacy* (Kjærgaard & Sorensen, 2014). This begins with choosing the best formal program that fits his/her needs and extend to creative augmentation of the best available OER and informal learning opportunities.

Learner satisfaction

As we saw above, Thesis 2 suggests that having more than one kind of high-level interaction is likely to be associated with higher learner satisfaction. With OER and informal learning opportunities, when a program provides only one kind of high-level interaction, students can gain a higher level of satisfaction by using other kinds of high-level interactions from outside sources. Take, for example, the *flipped classroom* in which students acquire both information and knowledge through searching for OER in order to complete tasks or assignments and then use the formal course time for topical discussion. Hypothetically, the student’s satisfaction level would be quite high, while costs are constrained. This has been shown in a number of recent studies of blended learning and flipped classrooms in a variety of contexts (Bishop & Verleger, 2013; Street, Gilliland, McNeil, & Royal, 2015; Butt, 2012). Therefore, like learning outcomes, an individual learner gains high satisfaction from any formal or fixed learning design depending upon his/her ability to obtain and effectively utilize an additional *surplus*. This could further be facilitated if the provider (course tutor, content designer, etc.) provides training in OER selection and a helpful resource bank for consultation, student recommendation and augmentation.

Cost/time issues

Since interaction has both cost and time components, the cost/time issues warrant an in-depth, complex analysis, particularly when OER and informal variables are involved. The dollar sign symbol represents cost; whereas, the clock symbol represents the time spent during an interaction.

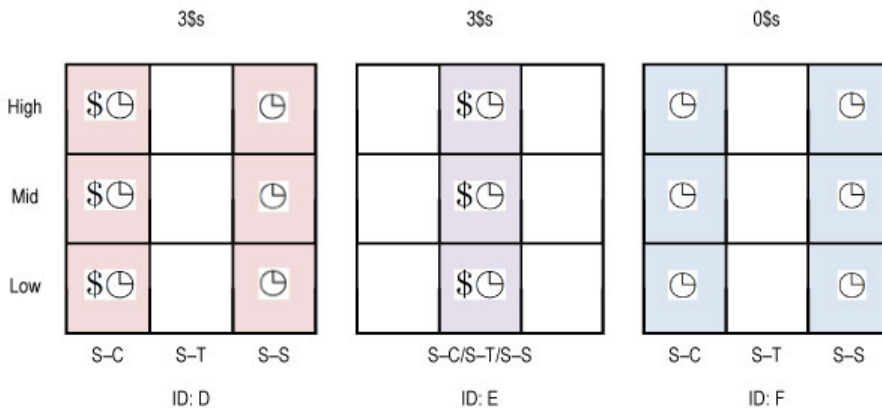


Figure 3. EQuiv in OER and Formal Learning

The figures in Figure 3 represent three hypothetical cases of high-level interaction:

- ID: D (the left side) – The formal program provides high-level interaction Student Content (S-C), and high level Student–Student (S-S) is provided in some way (by the program or through learner initiative). This model is practiced in many commercial MOOCs. MOOC financial models are evolving but will likely focus on advertising and sale of auxiliary product.
- ID: E (the middle) – The formal program provides a high-level interaction of one kind, and the learner is committed only to this format. This format is offered for example, by purchase of a training package delivered via video, CAI or text.
- ID: F (the right side) – High-level quasi-cost-free interaction of two kinds are used at the learner’s initiative as for example, by engagement in a set-based Learn.ist cluster, supplemented by a local study group.

Following the EQuiv theses, ID: E is a design in which the educational institution is concerned and tasked with creating high quality; whereas, ID: D is a design that is focused on maintaining an equal level of quality learning, but provided by the institution creating high quality content and encouraging the student to find their own S–T and S–S support. However, we should note that a higher level of satisfaction is not cost-free: it consumes more time of the learner, which is not free but precious because learners in online and distance education are often persons with both employment and domestic responsibilities. *Opportunity cost* (Matkin, 1997) applies to everyone – time spent studying precludes engaging in other activities. In other words, in terms of time efficiency, with ID: E, students spend only 3 dollar-time units (DTUs) for one kind of high-level interaction to complete the formal requirements; whereas with ID: D, students spend 3 DTUs for high-level S–C interaction to fulfill the formal course requirements plus 3 DTUs for high-level S–S interaction outside but paying 3 DTUs for the formal part only; with the ID: F design, although it may be inexpensive for the active use of OER and others, the learner may have spent twice as much time, that is, 6 DTUs, though they may pay quasi-zero dollars in reality, to gain a level of learning similar to ID: E. In sum, there are *visible* and *invisible* costs and the learner could spend more (of either of these scarce resources) to gain the same, or worse, less. This invisible time-cost does exist all the time but the OER and informal learning opportunities make the extent of this invisibility more pervasive.

It is worth noting that the same argument also applies to the teacher experience. With no or low cost for additional interaction for the educational providers, those *surplus* interactions are more likely to be suggested as options rather than requirements. That is, the surpluses may appear to be cost-free, but in actuality, they are volunteer activities that consume the teacher's time.

And when we go back to Thesis 2, more than two kinds of high-level interaction increase the level of satisfaction. On the other hand, the level of satisfaction depends on the time-cost efficiency as well, where satisfaction level differs learner to learner: for those who value time, even if ID: D and ID: E cost the same, ID: E may be more satisfactory. In the same way, those who value time prefer choosing ID: D over ID: F even if he/she has to pay because ID: D saves valuable time. In other words, in the OER and informal era, time-cost efficiency becomes even more critical in choosing the best formal learning experience. The quality-time-accessibility triangle posited by Daniel (2003), in reference to the external vectors of education and mega-universities, may now be re-phrased as both institutional vectors and the individual learner vectors of *quality-time-cost* especially in the places where the issue of accessibility is more attenuated by the Internet.

Discussion and further direction

From the EQuiv perspective, it seems apparent that *formal education* should and indeed must cost less if it hopes to survive in an era when alternative forms of free educational opportunities grow rapidly. However, *time is money* principle suggests that the time needed to achieve quality learning may remain consistent in this new era of learning. Additionally, this paper admits that there needs to be a higher level of a learner control over his/her learning design by creating necessary *surpluses* as well as *reductions* in order to produce learning at the highest level of effectiveness and efficiency. For this to be achieved, there needs to be a high quality of learning resources available and learner must have high levels of time management skills and network literacies. In sum, the ability to *manage the cost and the time for learning* is becoming extremely critical to both formal students and lifelong learners in this emergent world of network-enhanced learning.

In this context of new learning, how does the formal education claim its *raison d'être*? The answer implied in this paper is to provide education that creates adaptable models of high-level interaction – but allows the learner to augment or choose adaptations

that meet their time and money constraints and resources. In other words, select Thesis 1 and adhere to it. This minimalism seems to be the only way to survive in the ever-tightening world economy, constantly diminishing public support for higher education and increasing needs for life-long learning opportunity. Consequently, for learners who have acquired the skill of managing his/her learning, the formal educational system is losing its traditional status and authority as the only authentic education provider. It is time that we accept this change and re-create our institutions for service and success in a networked, lifelong learning context.

Resource-sharing

We have created a web site that collects references and resources for studies relevant to the EQuiv (<http://equivalencytheorem.info>). We welcome people who have a serious interest in the research regarding the EQuiv. We invite you to contact us at this website for further information sharing and collaborative research projects regarding the development of the EQuiv.

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eTandem Language Learning Integrated in the Curriculum: Reflection from Students' Perspectives

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Abstract

This article presents an eTandem course between two distant languages – Chinese and French, at institutional level – between the Unit of Chinese Studies of the University of Geneva, Switzerland, and the French Department of Hubei University, Wuhan, China. The course, targeted for second-year students (Level A2-B1 according to the Common European Framework of Reference for Languages, CEFR, 2001) from both sides, included theme-based asynchronous learning activities in the LMS Moodle platform as well as task-based synchronous oral communication via Skype. Taking into consideration the socio-institutional differences between the two counterparts, one focusing on literacy and cultural knowledge while the other emphasising pragmatic linguistic competences, the course design followed a careful and iterative instructional design procedure so that the eTandem course be gradually integrated in the curriculum of both universities. This article studies the students' expectations, participation, satisfaction and feedback based on the data collected during the three-year implementation of the project. The findings show that the students have benefited both linguistically and culturally from the eTandem exchange. However, issues like designing more contextualised online exchange tasks as well as normalising the course in both universities remain important future work.

Abstract in Chinese

本文介绍的中法文e搭档课程是由瑞士日内瓦大学法语系和中国湖北大学法语系共同设计的。课程面向具有中法基础的法语母语学生和具有中法基础的法语母语学生（正学法语/法至少一年并达到相当于欧洲语言标准A2到B1的水平）。课程依托网络平台Moodle和网络交流工具Skype为学生提供“活”的语言

学 境, 学生通 一 一的在 交流, 参加以主 基 的任
 型 言 践 程, 利用母 互相帮助, 和提高 合 用所
 学 言知 和技能, 同 增 双方的社会文化了解。在充分考
 学校和 差 的基 上
 (学系 重培 能力和 播文化知 , 法 系注重培 用
 能力), 本 程通 反 循 的教学 , 将 程融入到各校教
 学大 行了初步的 。本文根据三年的 数据, 通 研究学
 生的 程期望、 程参与、 程 价以及反 , 分析了 程
 的得失。研究 果表明E搭档 程 学生从提高 言能力, 培 文
 化意 , 以及增强学 机方面受益; 同 也 研究者意 到如何
 更加适合学生学 情境的任 , 如何使 程常 化仍然是将来
 重要的研究工作。

Abstract in French

Cet article présente un cours d'échange linguistique eTandem entre deux langues distantes – le chinois et le français en milieu institutionnel – entre l'Unité des études chinoises de l'Université de Genève en Suisse romande, et le Département de français de l'Université du Hubei de Wuhan en Chine. Prévu pour des étudiant-e-s de deuxième année de chacun des établissements (niveau A2-B1 du Cadre européen commun de référence pour les langues, CECR, 2001), le cours comprend des activités d'apprentissage thématiques asynchrones sur la plateforme d'apprentissage Moodle, ainsi que des tâches de communication orale synchrones via Skype. Du fait des différences socio-institutionnelles entre les deux parties – esprit critique et apprentissage de la langue en vue d'acquérir des connaissances en histoire, en littérature et en culture chinoises pour l'une, compétences pragmatiques en linguistique appliquée du français pour l'autre – la conception du cours eTandem a suivi une procédure de scénarisation pédagogique soignée et itérative afin d'être peu à peu intégrée aussi bien que possible dans les curriculums de chaque institution. Sont présentées ici les données collectées sur les attentes, la participation, le degré de satisfaction et les retours écrits des participant-e-s durant les trois ans de la mise en œuvre du projet. Les résultats montrent que les étudiant-e-s ont bénéficié de l'échange eTandem autant du point de vue linguistique que culturel. Il reste toutefois des questions ouvertes sur comment, par exemple, mieux contextualiser les activités d'échange

dans la scénarisation pédagogique des leçons, ou sur comment pérenniser ce cours dans les deux universités.

Keywords: eTandem, Chinese as a Foreign Language, French as a Foreign Language, normalisation

Introduction

Tandem language learning, as an original language learning approach, occurs when “two language learners with different native languages communicate with one another sharing the common objective of learning from each other” (Little, 1998). How to benefit most from this “ideal” language learning approach within this autonomous, reciprocal and collaborative learning context has been an interesting research question. Many language teachers and researchers have applied the approach formally or informally in their teaching and research practices, be it through face-to-face or any other modes of asynchronous or synchronous interaction (O’Rourke, 2007).

This article presents a summary of the findings of a three-year eTandem exchange course between two distant languages – Chinese and French at institutional level – between the Unit of Chinese Studies of the University of Geneva, Switzerland, and the French Department of Hubei University, China. The summary focuses on the students’ perspectives about the eTandem course. It is based on the data obtained from four different sources: the pre-exchange survey of students’ language profile and expectations for the exchange, the formal yearly course evaluation administrated by the University of Geneva, the statistics given by the students’ logging on Moodle and the face-to-face interviews with the students from both universities at the end of each academic year.

The project was initiated in 2009 by the Unit of Chinese Studies of the University of Geneva as an important part of the Chinese blended-learning programme called ChineWeb. It is still ongoing. The participants are, for each academic year, the second year language students from both sides (Level A2-B1 according to Common European Framework of Reference for Languages, 2001). The course includes theme-based asynchronous learning activities on the Learning Management System (LMS) platform Moodle as well as task-based synchronous oral communication via Skype.

The main objective is to promote autonomy in the language learning process in order to make the students aware of the importance of *learning how to learn* as well as helping them to become responsible for their own language learning. The immediate objectives involve developing the students’ linguistic competences through

communication with native speakers of the target language as well as getting them to better know and understand the target culture.

Socio-institutional context

The two universities share certain basic features in language teaching, such as the emphasis on the development of linguistic skills that include communication skills on similar topics. Compared to Hubei University, the Unit of Chinese Studies of the Faculty of Humanities of the University of Geneva focuses more on developing the students' ability on learning and understanding Chinese history, society and culture, especially ancient and modern Chinese literature. The strength of the curriculum is thus laid more on reading and writing than on oral comprehension and communication. The eleven hours of Chinese courses that the second-year students attend each week do not involve linguistic skills practice courses such as listening and speaking. As a result, many students express a strong need for practicing what they learn in face-to-face instruction. Besides, the fact that some students take other mandatory or optional subjects at the same time also prevents them from investing too much time on Chinese learning.

On the other hand, the training and the practice of linguistic competences come first in the curriculum of the French Department of the Faculty of Foreign Languages of Hubei University, especially for second-year students. However, they do not have many opportunities to speak French due to the great number of students in each class (25-30 per class). The opportunity to communicate with native French/Chinese speakers of their own age is undoubtedly a big attraction to students from both universities. In order to know exactly what the students expect to benefit from the eTandem exchange, we have collected information from a pre-course survey at the beginning of each year's course.

Figure 1 shows (see below) that the benefits the students expected from an eTandem exchange include improving oral communication skills, establishing a good friendship or a stable collaborative relationship with their language partners, exchanging cultural knowledge, and improving oral comprehension. Some also expected benefits in terms of vocabulary and grammar learning, as well as improving writing skills.

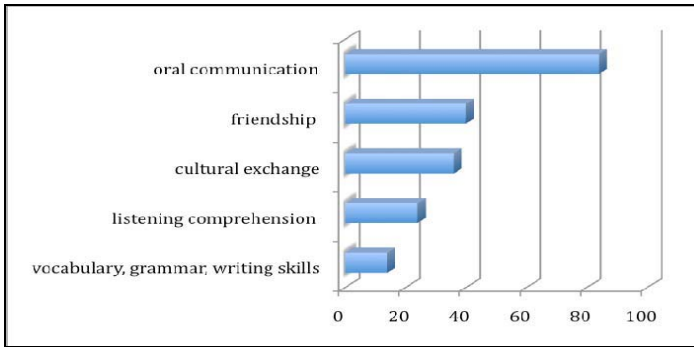


Figure 1. Students' expectations from the eTandem exchange (data from the surveys of 2010-2011, 2011-2012, and 2012-2013)

The course structure

As a language practice course integrated into the Chinese blended-learning programme, the eTandem course has chronologically gone through different design cycles. Before launching a large-scale course, a pilot project was conducted between the two universities. Based on the students' feedback and the ergonomical analysis of the course feasibility, pre-course preparation, fixed course schedule, the bilingual course environment and online tutoring were kept to design the large-scale course that started in 2010. The courses in the year 2011-2012 and 2012-2013 have been iteratively redesigned on the basis of the analytical results of the former design so as to better adapt to the curriculum as well as to the students' needs.

Before the course began, all students were required to fill an online questionnaire to get registered. The survey included students' language profile and open questions about their expectations from the exchange. A face-to-face training session was organized by the teachers of both universities to help the students get familiar with the Moodle platform and Skype. As for the forming of eTandem partners, in the year 2010-2011, it was the teachers who matched the language partners. In the year 2011-2012, in response to the students' suggestions, this was replaced by a *tandem forum* where the students were encouraged to present themselves, to exchange messages and get in touch with each other through e-mails to find their partner.

Before each exchange, the students checked the task instruction for the session and consulted their partners' learning materials as a reference as to what extent they could provide aid during the exchange. There were 3 kinds of tasks for each theme, including: (a) a theme-based description or narrative task in the target language; (b) a question-answer discussion in both mother tongue and target language; and (c) a

written summary of the exchange in their native language in the forum of each session. During the exchange, the students were required to strictly respect the principle of reciprocity: 30 minutes in French and 30 minutes in Chinese.

The outcomes of the course

Data collections

At the end of each academic year, the students from Geneva were asked to fill in a formal course evaluation questionnaire administrated by the University of Geneva. A complete evaluation report was sent to the teachers directly afterwards. The evaluation form consisted of 4 parts with 12 5-scale questions about the course content and its organisation, teaching evaluation, as well as global appreciation, and 4 specific questions on the eTandem exchange, together with 3 open-ended questions about the comments or suggestions on the exchange. The questionnaire was translated in Chinese and was sent to Hubei University, where the data was then treated separately. Besides, after each weekly session of the exchange, the students were required to fill in a short self-evaluation form to report on the exchange process. And finally, an interview at the end of each semester was organized at both universities to collect students' comments on the course.

Students' global appreciation of the eTandem course

In general, the Geneva students' perceptions as whether they have achieved the objectives are overwhelmingly positive (see Figure 2 below, 100% in 2010-2011, 100% in 2011-2012, 97% in 2012-2013). The result from Hubei University was not different from that of their counterpart.

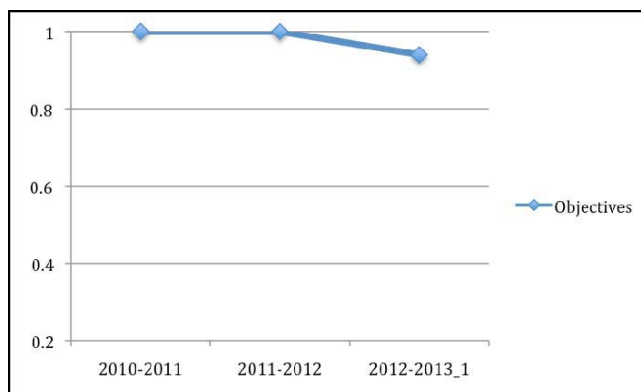


Figure 2. The attainment of course objectives (2010-2011, 2011-2012, 2012-2013_1) UNIGE

Despite a small drop in the year 2011-2012, the students showed their satisfaction with the eTandem course (see Figure 3 below).

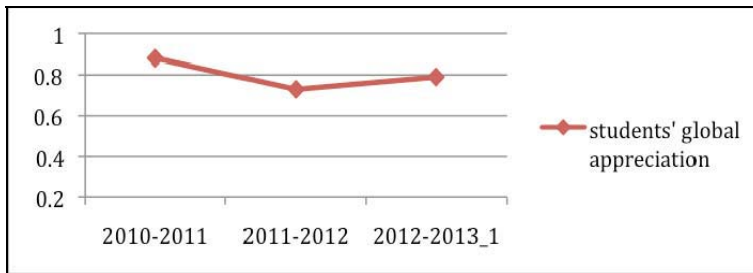


Figure 3. Students' global satisfaction with the eTandem course (2010-2011, 2011-2012, 2012-2013_1)

The obstacles

Technical problems were reported to be the biggest obstacle for a successful exchange (see Figure 4 below). The breakdown of the Internet connection (during the academic year 2010-2011, the campus internet current was limited by the government, which was especially disastrous for the students of Hubei University), the cutting off of Skype, as well as other small technical problems discouraged the students from time to time. Besides, some students also regarded the preparation load to be a little too heavy and they demanded that the course materials be more related to their curriculum.

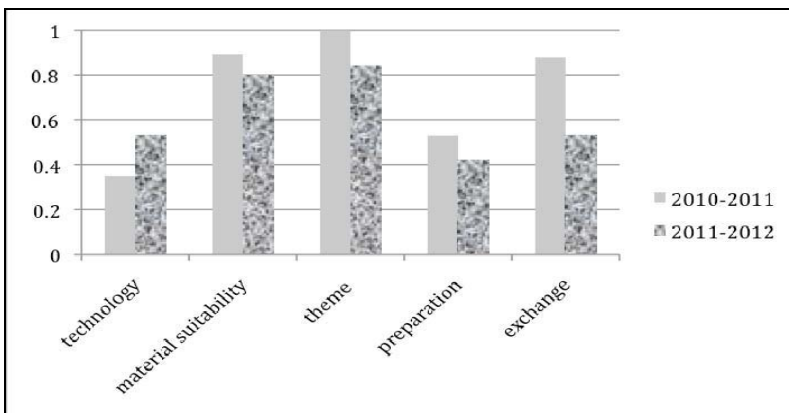


Figure 4. Students' satisfaction index with the eTandem course (2010-2011 and 2011-2012, UNIGE)

Do the benefits meet the students' expectations?

The students' perceived benefits included improving their speaking skills and understanding better understand each other's culture. A lot of students noted the increased confidence in their use of the target language, as they were not afraid of *speaking Chinese/French*. The practice in the authentic target language with native Chinese/French speakers helped them to better know the target language as they were really put *in the bath* during the exchange. They also emphasized the precious experience of learning about the target culture through exchanging with people of their own age. The statistics were completed by interviews with the students at the end of each year, from which we include their commentaries about the benefits that they mentioned.

Ils permettent de mettre en place du vocabulaire en plaçant les mots dans un contexte. Ils nous donnent des structures/phrases utiles à l'oral. (The course helped to put the vocabulary into context. They teach us structures and sentences that are useful orally.)

首先, 交流的 比 活, 便于我 自由安排; 其次, 可以与搭档 所欲言, 能了解到很多 本上学不到的 西; 最后, 彼此的口 水平和 量都有很大的帮助。(First, the flexible exchange time helped us to organise our learning autonomously; second, talking with a language partner helped us to know a lot of non-book knowledge; last, it was really beneficial for the improvement of speaking skills and vocabulary learning.)

平 在学校有很少的交流机会, 个交流 我 提供了平台, 我 可以在 余 法 , 和真正的法国人 法 , 能 自己想 的 , 而不是局限于 本。而且可以 我 法 没有畏惧感。(As we don't have much opportunity to speak French at school, the course provided a platform for us to communicate in French with REAL French native speakers. Besides, we can talk about other subjects instead of being constrained by the textbook. We are no longer afraid of speaking French.)

程 我 所 学 的 和 表 法 提 供 了 一 个 很 好 的 用 的 平 台, 帮 助 我 培 法 的 , 加 深 了 国 外 文 化 的 了 解 。 (The course provided a good chance for us to practice the words and expressions that we have learnt. It helped us to develop a good habit of speaking French, and at the same time deepened our knowledge about the French culture.)

Besides the linguistic benefits, almost all students mentioned the enthusiastic experience of the cross-cultural exchanges they had with their partners. For one Swiss student, the Chinese students were no longer OVNI (UFO) since he got a lot of information about Chinese culture *en live* (on live) with a *vrai Chinois* (real Chinese). The course was *grammaticalement et humainement intéressant* (grammatically and humanly interesting).

Most students felt that their partners *aident vraiment à nous ouvrir et progresser* (really help us to open up and make progress), that they mutually gained more confidence in oral communicative skills.

Parts of the students' perceptions were actually quite accurate as the final results of the oral test showed a clear improvement in the development of their speaking skills, especially pronunciation, higher confidence in their use of the target language and a greater knowledge of the target culture. However, more evidence is needed to prove the relation between these improvements and the eTandem exchange.

Students' participation in the forums

The statistics extracted from the Moodle LMS also showed the students' active participation in the online course, especially the posts in the forums opened for each session. After each exchange, the participants were encouraged to write a summary of the exchange in their mother tongue for their language partners. In the year 2011-2012, most students did not understand the real benefit of this task and they mentioned that during the interview. We thus emphasized the importance of the feedback-summary in the pre-course training. As a result, the messages that the students posted almost doubled during the first semester of the year 2012-2013.

Table 1: The comparison of students' posts in Moodle forums (2011-2012, 2012-2013_1)

Academic year	2011-2012	2012-2013_1
Students number	82	99
Total student post number	401	955
Average post per student	4.9	9.6

The students not only resumed what their partners said during the exchange, they also added their own comments concerning the cultural information that they had learnt during each session, their personal feeling about their partners and the exchange process.

By exchanging about cultural topics they get to know each other, understand each other, share the same point of view or become open to different opinions with less bias.

在瑞士，很多学生都是靠自己打工来支付所有的。(In Switzerland, many university students work on their own to pay for all the daily expenses.)

到怎保境的，我才 Sara是个很大自然的人，作一个志愿者加入了一个保物的机，自然和人类都是相互尊重的，Sara真是个人喜的女孩！(When talking about environmental protection, I found out that Sara was a nature-lover. She joined an animal protection association as a volunteer; she thought that nature and human being should respect each other. She is really adorable!)

我都得没必要花玩网游，花在更有价的地方。(We both agreed that money should be spent on something more worthwhile than on playing video games.)

次，我从James身上了解了很多巴黎人的日常以及他待奢侈品和中国人待奢侈品的或相同或不同的度，我受益匪浅！(In this exchange, James let me know how most people in Paris pay for their daily expenses, and the different

attitudes towards luxury products between the Chinese and the French. I've learnt a lot!)

Elle m'a appris l'adage : le matin, manger comme un empereur, à midi manger comme un homme ordinaire et le soir manger comme un mendiant. Je suis donc un mendiant du matin qui devient empereur le soir ! (She taught me a Chinese saying: Eat breakfast like an emperor, lunch like a king, and dinner like a beggar. I'm a beggar in the morning and an emperor in the evening!)

Selon l'expression, 'les voyages forment la jeunesse', il est vrai que les voyages en solitaire permettent de prendre confiance en soi et de pouvoir prendre les bonnes décisions. C'est une bonne occasion pour apprendre à se débrouiller seul. (According to the expression, "travel broadens the mind", it is true that traveling can help to gain confidence and to be able to make good decisions. This is a good opportunity to learn to be independent.)

The joyful learning experiences enrich their vocabulary, especially the proverbs.

Je remercie beaucoup mon etandem Fanny qui me fait mieux connaître la Chine et qui m'apprend des nouveaux mots et a beaucoup d'humour. (I am very grateful to my tandem Fanny who helps me to know better China and who teaches me new vocabulary with a lot of humor.)

Elle m'a appris une expression pour parler des gens qui, contrairement aux gens qui voyagent, ne connaissent pas grand chose: 井底之蛙. (She taught me an expression to describe people who, contrary to those travel a lot, know nothing about the outer world: a frog at the bottom of the well.)

A propos de Guilin, elle m'a appris une expression disant que les paysages de Guilin sont les plus beaux du monde: 桂林山水甲天下. (About Guilin, she taught me an expression to say that the Guilin landscapes are the most beautiful in the world: East or West, Guilin landscape is best.)

A pleasant collaborative friendship was also established step by step as the course progressed.

我 互相了解, 互相帮助, 互相学 , 正聊天中的 。我
得能有一个互助的 伴是一件很好的事情, 很期待下次的交
流。(We tried to understand each other, to help each other, to learn
from each other and correct each other. I found it wonderful to have
a helpful partner. I'm looking forward to our next exchange.)

*Elle parle très bien français et elle me corrige quand je fais faux.
C'était très sympathique de parler avec elle et je pense qu'on va
devenir de bons amis. Trop cool / 太酷了! (She speaks very good
French and she corrects me whenever necessary. It was very nice
talking to her and I think we will become good friends. It's really
cool! / Too cool!)*

*Elle m'a corrigé mon chinois avec beaucoup de patience. J'ai eu des
scrupules à raccrocher après 1h de conversation avec une personne
aussi adorable! (She corrected me with a lot of patience. I was
reluctant to cut the conversation after talking for one hour with such
an adorable person!)*

The teachers felt very happy to read the high-spirited posts written in the forums week after week. Another proof of the success of the exchange was found in the fact that several students from the 2010-2011 academic year reported keeping contact and communicating with their partners even after the course. They decided their own learning objectives, chose the topics they felt like discussing, and tried to get the best from the exchange with their language partners.

Future work

Undoubtedly, the Chinese-French eTandem course has brought great benefits to the students, not only linguistically, but also culturally. We will continue this course with a more adaptive design according to the students' feedback. A solid partnership between the University of Geneva and Hubei University is vital for the success of this Chinese-French eTandem exchange project. Taking into consideration a long-term collaboration, the future work will focus on finding a solution to the technical problems as well as *normalizing* the course (O'Dowd 2010) in Hubei University.

Among others, research questions like how to evaluate the oral exchange, how to foster students' learner autonomy for their future language learning remain to be solved in the long run.

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Concept Learning via SMS Delivery at the University Level

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Abstract

Latest technology based distance learning and mobile learning delivery platforms include cell phone based SMS technologies that provide access to learning materials without being limited by space or time. Sophisticated technological advances in the domain of pedagogical delivery have led to motivated, flexible, user-friendly, controlled and adaptive learning using cell phone delivery platforms.

In the present study three groups of first year university students who studied Jewish concepts in an elective 15 week long (semester) course were exposed to three different modes of concept delivery. The first group of students received weekly lists of Jewish concepts sent via SMS messages to their cell-phones, the second group received weekly lists of Jewish concepts sent via email messages to their email inboxes, and the third group of students received weekly snail mail lists of Jewish concepts.

The definitions of Jewish concepts studied by SMS, email and snail mail delivery platforms were identical and the students received 20 Jewish concept definitions on a weekly basis (except for weekends) for a period of 15 weeks. At the end of this period the students in the three groups were tested on a standardized Jewish concepts achievement test and responded to a questionnaire that examined their levels of learner curiosity, learner self-efficacy and learner technological self-confidence.

Results of the study indicate that there were no significant differences between the achievement scores on the standardized Jewish concepts achievement test attained by students in the SMS to cell-phone delivery group, the email delivery group and the snail mail delivery group. However, there were significant differences between the students in the three different delivery groups regarding their levels of learner curiosity, learner self-efficacy and learner technological self-confidence. The students who received Jewish concepts via SMS messages indicated a significantly higher level of learner curiosity than their counterparts who received lists of concepts via email messages who in turn exhibited a

significantly higher level of learner curiosity than students who received concepts via snail mail.

Students in the SMS group also had a significantly higher level of learner self-efficacy than their counterparts in both the email and snail mail groups. No significant differences were found between students in the email group and those in the snail mail group on the learner self-efficacy factor. Lastly there were no significant differences between the levels of students in the SMS and email groups on the learner technological self-confidence factor. However, students in both SMS and email groups were significantly higher than students in the snail mail group on this factor.

The results of the study indicate the potential evident in SMS based cell-phone technology regarding enhancement of students' attitudes toward learner curiosity, learner self-efficacy and learner technological self-confidence. Thus cell-phone based SMS messaging can become a viable technological mobile delivery system in the university learning process and serve as a routine platform for the delivery of relevant learning materials.

Abstract in French

Les dernières technologies d'apprentissage à distance et les plateformes mobiles d'enseignement s'appuient sur les technologies de SMS sur téléphone cellulaire qui permettent l'accès à des contenus pédagogiques en s'affranchissant des contraintes de temps et d'espace. Les avancées technologiques dans la mise à disposition de contenus pédagogiques sur plateformes mobiles ont conduit à un apprentissage, plus motivant, plus flexible, plus interactif, mieux contrôlé et adapté.

Dans cette étude, trois groupes d'étudiants de première année universitaire ayant étudié des concepts juifs durant un semestre de 15 semaines ont été soumis à trois différents modes d'enseignement à distance. Chaque semaine, des listes de concepts juifs ont été envoyées aux trois groupes; par SMS sur téléphone cellulaire au premier groupe d'étudiants, par courrier électronique au deuxième groupe d'étudiants et par courrier postal au troisième groupe d'étudiants.

Les définitions des concepts juifs étudiées étaient identiques quel que soit la plateforme mobile d'enseignement utilisée; SMS, courrier électronique ou courrier postal. Pendant 15 semaines, les étudiants des trois groupes ont reçu, chaque semaine (sauf le week-end), 20 définitions de concepts juifs. Au terme de cette période, les trois groupes d'étudiants ont passé un examen visant à tester leurs connaissances sur ces mêmes concepts juifs étudiés et ont répondu à un questionnaire mesurant leurs niveaux de

curiosité, d'efficacité et de confiance en soi liée à l'utilisation des technologies.

Les résultats de l'étude montrent l'absence de différence significative entre les différents groupes d'élèves quant à leurs résultats à l'examen portant sur les concepts juifs, qu'ils appartiennent au groupe ayant reçu les concepts juifs par SMS, par courrier électronique ou encore par courrier postal.

Cependant, les résultats ont indiqué des différences significatives entre les élèves des trois groupes quant à leurs niveaux de curiosité, d'efficacité et de confiance en soi liée à l'utilisation des technologies. Les étudiants ayant reçu les concepts juifs par SMS ont manifesté un niveau de curiosité significativement plus élevé que les étudiants ayant reçu les listes de concepts juifs par courrier électronique. Cependant, ces derniers ont manifesté un niveau de curiosité significativement plus élevé que les étudiants ayant reçu les concepts juifs par courrier postal.

Les élèves appartenant au groupe utilisant le SMS avaient également un niveau d'efficacité significativement plus élevé que les étudiants du groupe utilisant le courrier électronique ou encore que les étudiants sollicités par courrier postal. Aucune différence significative n'a été trouvée entre les étudiants du groupe sollicité par courrier électronique et ceux du groupe sollicité par courrier postal sur le facteur d'efficacité. Enfin, aucune différence significative n'a été relevée entre les niveaux des élèves du groupe utilisant le SMS et les élèves du groupe utilisant le courrier électronique sur leur confiance en soi liée à l'utilisation des technologies. Toutefois, les élèves appartenant au groupe utilisant le SMS ainsi que les élèves ayant utilisé le courrier électronique ont manifesté des niveaux de confiance en soi liée à l'utilisation des technologies plus élevés que les étudiants appartenant au groupe sollicité par courrier postal.

Les résultats de l'étude montrent un potentiel évident dans l'utilisation du SMS par téléphone cellulaire dans l'amélioration des comportements des élèves à l'égard de leur curiosité d'apprentissage, de leur efficacité ou encore par rapport à leur confiance en soi liée à l'utilisation des technologies. Ainsi, dans le processus d'apprentissage universitaire, la messagerie SMS sur téléphone cellulaire peut devenir un système viable de transmission par technologie mobile et servir de plateforme courante pour l'enseignement de contenus pédagogiques.

Keywords: SMS; Email; Snail Mail; Learner Curiosity; Learner Self-Efficacy; Learner Technological Self-Confidence

Introduction

Many universities increasingly implement a variety of technology based distance learning methodologies as viable alternatives to traditional classroom instruction. Distance learning platforms via internet, email and cell-phones are increasingly penetrating the domain of academic learning and provide students with dramatically increased access to sources and subject matter relevant to their studies. Current technology based distance learning is, inter alia, based on materials provided through methodologies such as internet, email and cell-phones and an ever increasing number of research studies are being conducted in order to verify the educational value of such technology based distance learning methodologies at the university level (Harris, 2012).

Technology based distance learning

Distance learning has developed over the years to overcome the limitations of traditional face-to-face learning which necessitates the presence of the student in a formal classroom setting. From its inception when distance learning was confined to the delivery of learning material via snail mail, landline telephone and radio broadcasts, it has progressed through delivery systems such as television broadcasts and videoconferencing and at present focuses on digital delivery systems such as internet, email and mobile learning platforms (Katz & Yablon, 2003).

Recent studies have indicated that distance learning systems are perceived by students as being convenient, flexible, time saving and cost saving (Valenta et al., 2001). Interactive internet, email and mobile learning offer tuition that is especially characterized by flexibility offered to the learner. In addition the above methodologies are designed to provide platforms that enhance modification, reinforcement and even modelling of learning processes, thereby fulfilling the cognitive as well as affective needs and requirements of students (Richardson & Swan, 2003).

Ismail et al. (2010) confronted the implications of university learning and instruction using technology based distance learning courses. They contended that technology based distance learning has moved formal instruction in these courses from the on-site setting of the university campus to the home of the student. Learning has become significantly more flexible and content sources more accessible. Creating, sharing and knowledge capitalization are all facilitated by distance learning. Wider sources of learning are provided in technology based distance learning courses and worldwide expertise can systematically be brought to the student's desktop.

With the rapid development of distance learning courses for use in university level education, increasingly more research studies have been conducted in an attempt to evaluate different issues related to technology based distance learning. For example Chandra & Watters (2012) indicated that learning physics through the medium of technology based distance learning not only enhanced students' learning outcomes, but also had a positive impact on their attitudes toward the study of physics. Ituma (2011) confirmed that a large percentage of university students who were enrolled in distance learning university courses had positive perceptions of the technology based learning methodology and were in favour of joining additional distance learning courses that supplemented traditional face-to-face classroom instruction.

Valaitis et al. (2005) found that students who participated in technology based distance learning courses perceived that the methodology increased their learning flexibility and enhanced their ability to process content, and provided access to valuable learning resources. Abdallah (2009) found that technology based distance learning courses contributed to improved quality of students' learning experiences. Students reported positive attitudes toward their technology based learning and felt that such learning should be part and parcel of standard learning practice. Delfino et al. (2010) confirmed that student teachers who participated in technology based distance learning teacher training courses developed self-regulation of learning which provided them with the opportunity to flexibly cope with their academic assignments.

Cell-phone learning

One of the emerging learning strategies that has developed in technology based distance learning in recent years and is receiving growing attention from both students and teachers is in the domain of mobile learning, and more specifically, focuses on cell-phone learning technology (Prensky, 2005). It should be noted that the use of cell-phones is multi-dimensional and cell-phone technology now provides technological possibilities including voice, text, still-camera, video, paging and geo-positioning capabilities. These tools provide a rich variety of platforms that enhance the learning process. Moreover, learning is not bound by space or time and students can choose to engage in learning without almost any limitations (Dieterle & Dede, 2006).

In Europe, China, Japan, and the Philippines, students already use cell-phones as learning tools. Thornton and Houser (2002, 2003) described several innovative projects using cell-phones to teach English at a Japanese university and the BBC World Service's Learning English section offers English lessons via SMS in Francophone West Africa and China (Godwin-Jones, 2005). Cell-phone based

learning projects managed by several universities worldwide have indicated the positive outcomes of such learning methods (Divitini et al., 2002; Garner et al., 2002; Seppala, 2002; Stone & Briggs, 2002). Additional studies have described language learning based on cell-phone technology (Kiernan & Aizawa, 2004; Katz & Yablon, 2009; 2011; 2012). These studies describe how vocabulary transmitted by SMS in a spaced and scheduled pattern of delivery contributed to student proficiency in English or other languages.

Research studies have been conducted in order to investigate the relationship between students' attitudes toward the cell-phone based learning process. Learner motivation, learner autonomy, learner control of the learning process, learning flexibility, learner curiosity, learner self-efficacy, learner technological self-confidence, and user friendliness of the technology strategy are some of the major factors that have been found to contribute to the enhancement of technology based distance learning. Mainemelis et al. (2002), Zurita and Bruce (2005), Cavus and Ibrahim (2009) as well as Katz and Yablon (2009, 2011, 2012) confirmed the association of some of the above factors with effective cell-phone based learning.

As Katz and Yablon (2009, 2011, 2012) have studied the centrality of students' attitudes including learner motivation, learner autonomy, learning flexibility and user friendliness of the technology strategy toward cell-phone learning at the university level in Israel, the current study, pays particular attention to students' attitudes toward three additional factors thought to enhance effective learning by cell-phone based SMS messaging, namely learner curiosity, learner self-efficacy and learner technological self-confidence. In addition the study examines the issue of academic achievement attained when using SMS delivery for the learning of concepts.

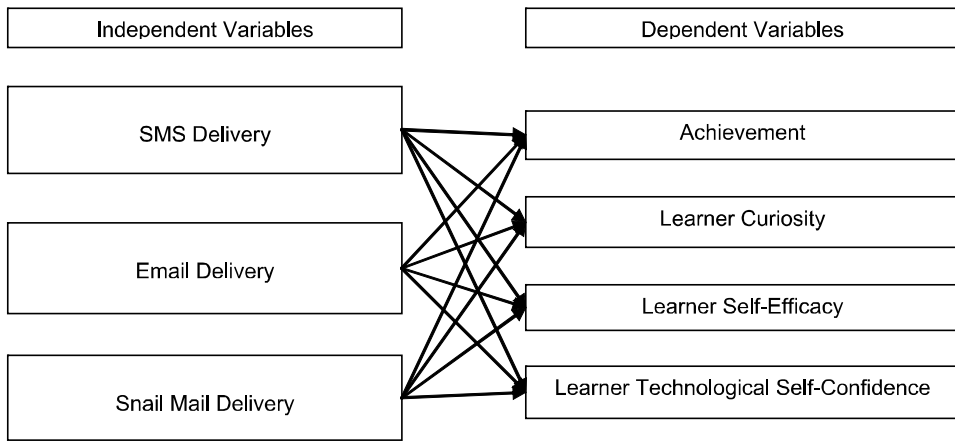


Figure 1. Graphic Illustration of the Research Model

Method

Sample

The research sample consisted of 79 first year students enrolled in a 15 week semester-long elective Jewish concepts foundation course offered at one of the seven chartered universities in Israel. The students were randomly assigned to the three different research groups in which students were provided with lists of definitions of Jewish concepts as follows:

1. 28 students received their Jewish concepts lists via cell-phone based SMS messages.
2. 26 were sent their Jewish concepts lists via email messages to their email inboxes.
3. 25 students were sent their Jewish concepts lists by snail mail delivery.

Instruments

Two research instruments were administered to the students in this research study. A standardized Jewish concepts test was administered to the participants in order to assess students' mastery of definitions of basic Jewish concepts. The test scale ranged from 0-100, the higher grades indicating higher levels of achievement on the Jewish concepts test. The second instrument administered was a 21 item Likert scale type response questionnaire (students responded to a five point scale with 1 = totally disagree and 5 = totally agree) designed to examine the students' perceptions of the

attitudinal research factors as follows: The first factor, learner curiosity, contained seven items (Cronbach $\alpha = 0.82$), the second factor, learner self-efficacy, consisted of eight items (Cronbach $\alpha = 0.86$) and the third factor, learner technological self-confidence, was made up of six items (Cronbach $\alpha = 0.88$).

Procedure

Students who were graduates of the Israeli state secular school system and who were enrolled in the elective Jewish concepts foundations course and possessed personal cell-phones with texting capacity were eligible for participation in this study. Following the selection of the students who met the above criteria, they were randomly assigned to the three delivery platform groups. Students in the first group received Jewish concepts via cell-phone based SMS messages; those in the second group received Jewish concepts via email messages; and those placed in the third group received Jewish concepts via snail mail.

The students in the three groups were sent weekly lists that contained concise definitions of the Jewish concepts studied in the course, each list containing definitions of 20 new Jewish concepts delivered via the respective learning strategies. Thus each of the students received definitions of 300 Jewish concepts during the 15 week long course. On completion of the course the students in the three groups were administered a standardized Jewish concepts achievement test in order to assess their level of knowledge of the 300 Jewish concepts taught in the course. In addition they were administered the attitudinal questionnaire which examined their scores on the three attitudinal research factors, namely learner curiosity, learner self-efficacy and learner technological self-confidence.

Results

The main aim of this study was to examine the efficiency and effectiveness of three different learning delivery platforms of which two were digital. Two research questions were posed: the first examined the acquisition by students of knowledge concerning Jewish concepts and the second investigated students' attitudes connected to the three learning strategies. The mean scores of each of the attitudinal factors were standardized in order to allow for a comparison between the factor scores. Standardized means and standard deviations of students' scores on the achievement test and on the attitudinal factors are presented in Table 1.

Table 1: Standardized Mean Scores and Standard Deviations of SMS, Email and Snail Mail Groups for Achievement, Learner Curiosity, Learner Self-Efficacy and Learner Technological Self-Confidence

Group	Learner Curiosity Factor		Learner Self-Efficacy Factor		Learner Technological Self-Confidence Factor		Achievement	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.
SMS Delivery N=28	3.55	0.24	2.85	0.42	3.84	0.46	82.62	10.71
Email Delivery N=26	3.13	0.52	2.55	0.43	3.79	0.49	82.53	11.39
Snail Mail Delivery N=25	2.93	0.51	2.50	0.41	3.48	0.41	81.97	10.32

Four one-way ANOVA procedures were used in order to compare students' achievement and attitudes as related to the three learning delivery platforms. Results of the statistical analyses indicated that while there were no significant differences between students in the three groups regarding achievement, with students from the three groups achieving similar grades on knowledge of Jewish concepts, significant differences were found for learner curiosity [$F(2,76) = 14.30, p < 0.001, \eta^2 = 0.27$], for learner self-efficacy [$F(2,76) = 5.18, p < 0.01, \eta^2 = 0.12$] and for learner technological self-confidence [$F(2,76) = 4.93, p < 0.001, \eta^2 = 0.16$]. Post-hoc Scheffe tests were then computed to establish the level of intra-group differences. The first Scheffe test revealed that students who received Jewish concepts via SMS messages attained significantly higher scores on the learner curiosity factor than students who received concepts via email messages who in turn achieved significantly higher scores than students who received their list of concepts by snail mail. The second Scheffe test indicated that students who received concepts through the medium of SMS messages attained significantly higher scores on the learner self-efficacy factor than either students who received concepts via email messages or those who received their concepts by snail mail. There was no significant difference between the scores attained on this factor by students in the email and snail mail groups. The third Scheffe test confirmed that while students in the SMS and email groups achieved significantly higher scores on the learner technological self-confidence factor than students in the snail mail group, there was no significant difference between the scores of students in the SMS and email groups on this factor.

Discussion

Results of the statistical analyses of the data collected in this study indicate that none of the three delivery platforms, namely delivery of the lists of Jewish concepts throughout the semester long course via SMS messages to students' cell-phones, delivery to students' email inboxes and delivery to students via snail mail, had any

significant advantage regarding academic achievement of students on the standardized Jewish concepts achievement test. Students who studied via all three delivery strategies attained similar grades on the test. Thus it appears that achievement is a factor that does not distinguish between delivery strategies with measured achievement outcomes. This result confirms those indicated in a number of research studies that, on the whole, different delivery platforms do not significantly contribute to differential academic achievement (Katz & Yablon, 2009, 2011, 2012).

However, the findings of the study indicate that the different delivery strategies employed in the present study to provide weekly lists of Jewish concepts to the students are associated with significantly differential levels of learner curiosity, learner self-efficacy and learner technological self-confidence. Scores attained by students on the attitudinal research factors, after receiving lists of Jewish concepts delivered via the three delivery strategies, confirm that SMS messaging to cell-phones is associated more significantly to students' learner curiosity and learner self-efficacy (as found by Kenny et al., 2012) than either email messages or snail mail delivery. The contribution of email messages, although less significant than that of the SMS delivery strategy, also contributed more significantly to students' learner curiosity and learner self-efficacy than lists received by snail mail. In addition, the SMS messages of lists of Jewish concepts sent to students' cell-phones as well as lists sent to students' email inboxes made a significantly higher impact on students' learner technological self-confidence than lists of concepts sent to students via snail mail. Although there is no statistically significant difference between students' levels of learner technological self-confidence after receiving lists of Jewish concepts via SMS or email delivery systems, the mean level of learner technological self-confidence of students' who received concepts via SMS delivery is higher than the mean level of their counterparts who received concepts through the medium of email delivery. It appears that as both SMS messages to students' cell-phones as well as lists sent to students' email inboxes may be identified as technologically oriented delivery strategies, they have a more significant impact on learner technological self-confidence than lists of concepts sent to students via snail mail.

It appears that learner curiosity is the most potent of the research factors and most significantly distinguishes between students who studied by way of the three learning strategies. Cell-phone based SMS strategy appears to be most significantly related to the learner curiosity of students towards the learning process, followed by a more moderate level of learner curiosity of those who experienced the email learning

delivery, who in turn have a comparatively higher level of learner curiosity than students who received learning material via the snail mail learning strategy.

The results of the present study indicate the potential of SMS messaging of relevant subject matter as a positive delivery platform that enhances affective variables such as learner curiosity, learner self-efficacy and learner technological self-confidence. It should be noted that the significant attitudinal findings do not correlate with higher academic achievement when the three delivery platforms are compared. Further studies need to be conducted so as to further explore the possible relationship between academic achievement and students' attitudes toward learner curiosity, learner self-efficacy and learner technological self-confidence. From a pedagogical point of view it appears that, In general terms, cell-phone-based SMS messaging leads to more significantly positive attitudes of students (as indicated by Song, 2008) than email or snail mail messaging with learner curiosity perceived as the central factor that best distinguishes between the three delivery strategies studied in the present research.

Conclusion

In conclusion it may be stated that the results of the present study indicate that, while the three delivery platforms used in the study to provide students with weekly lists of Jewish concepts were no different from each other in promoting students' academic achievement, the relative advantages of cell-phone based SMS messages most positively enhanced learner curiosity, learner self-efficacy and learner technological self-confidence of students. The results of the present study regarding the relationship between the delivery of subject matter at the university level via SMS messages sent to students' cell-phones and students' levels of learner curiosity, learner self-efficacy' learner technological self-confidence add to the findings of other research studies that indicated the significance of the SMS to cell-phone delivery platform for students' levels of learner motivation, learner autonomy, learner control of the learning process, learning flexibility and user friendliness of the technology strategy (following Divitini et al., 2002; Garner et al., 2002; Seppala, 2002; Stone & Briggs, 2002; Thornton & Houser, 2002, 2003; Katz & Yablon, 2009, 2011, 2012) These studies indicated that cell-phone based SMS delivery systems can be offered as a positive alternate technology based delivery system of relevant subject matter when compared to other technology based learning strategies that utilize expensive and sophisticated infrastructures. University educational systems in all societies, whatever their technological infrastructure, can profit immeasurably from the use of SMS to cell-phone learning content delivery in relevant university subjects and courses. More

accessible technology and improved pedagogy need to be developed in order to enhance the use of cell-phone based SMS delivery in routine learning at the university level but it seems clear that the mass incorporation of cell-phones in institutions of higher education is a distinct possibility in the foreseeable future.

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Teachers' Ideas about Learning, their use of Technology and Learner-Centred Classrooms

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Abstract

Despite the ubiquitous and prolific application of computer technologies in educational contexts, technology has not yielded significant transformations of classroom practice. One reason may be due to teachers' understandings of effective learning and how technology can be used to support learning. In this study, we observed and interviewed ten teachers who were considered to exemplary and known to use technology. While there were instances of technology being used to create learner-centred lessons, much of the time technology was used to make teacher-directed practices more efficient. Teachers' understanding of effective learning appears to play an important role in using technology to create learner-centred classrooms.

Introduction

The rapid development of technology and its application to educational contexts has presented educators with a unique opportunity to fundamentally change the way instruction occurs (Mayer, 2010; Richardson, 2012; Sheppard, Seifert & Wakeham, 2012). Teachers have at their disposal a vast repertoire of possibilities for creating enriched, engaging educational experiences. Most importantly, the utilization of technology creates the potential for developing classrooms that are learner-centred (Tamid, Bernard, Borokhouski, Abrami, Richard & Schmid, 2011). Yet, there is nothing inherent in the technology that will necessarily result in learner-centred classrooms. In fact, the evidence suggests that the adoption of technology leads to little change in classroom practice (Collins & Halverson, 2009; Cuban, 2001; John & Wheeler, 2008; Mayer, 2010; Penuel, 2006; Sheppard & Brown, 2014; Sheppard, Seifert & Kelly, 2008; Sheppard et al., 2012). For example, in a study of the adoption of laptops by students in a high school, Sheppard et al. (2008) reported that the laptops were little utilized and had minimal impact on practice. Teachers in these classes were likely to use the laptops for presentation of information, record keeping and communications while students seldom used them in support of their own learning.

Similarly, in 2009, Collins & Halverson observed “deep incompatibilities between the demands of the new technologies and the traditional school” (p.5) arguing that, “the lockstep model of most classrooms undercuts the power of the new technologies to individualize learning... [and moreover], trying to prepare students for the 21st century with 19th century technology is like teaching people to fly a rocket ship by having them ride bicycles.” (Collins & Halverson, p.5-6 & 9).

Having observed that technology has not yet transformed classroom practice, Mayer opined that the failure might be the result of a focus on technology rather than on learning per se (Mayer, 2010). That is, initiatives aimed at adopting technology have failed because they do not take the learner into account as a consequence of a flawed assumption that the teacher and learner will adapt to the new technology (Mayer, 2010, p.183). That is, while technology has the potential to create student-centered classrooms, it has failed to do so because it has ignored the two fundamental principles relating to learner-centred classrooms: (a) instruction is based upon a profound understanding of learning and (b) lessons are developed from the perspective of the learner (McCombs, 2000).

Learning and comprehension requires students to create meaning (Wittrock, 1989) by engaging in cognitive and metacognitive processes (Winne & Hadwin, 1998). These processes are executed by the student or invoked through appropriately designed instructional prompts, cues or tasks (Winne, 1985; Wittrock, 1989). Critical to effective learning is the development of self-regulatory and agentic processes (Zimmerman, 2000; Bandura, 2001; Puustinen & Pulkkinen, 2001) that may be heavily influenced by the classroom environment (Butler & Cartier, 2004; Perry, Vandekamp, Mercer & Norby, 2002).

In learner-centred classrooms, the students’ individual needs determine the teaching-learning processes. Although the content as outlined in the textbook or the curriculum guide may be considered as important, it is viewed as “powerless without an engaged learner” (Lent, 2012, p.14). As a consequence, teachers in learner-centred classrooms consider students’ abilities and interests, and focus on making tasks relevant. They recognize and support the diverse needs of students in their classrooms, provide students with choice and control over their learning, provide time for critical reflection, facilitate collaborative student engagement and critical reflection, and encourage students to make meaningful real-world connections (Lent, 2012; McCombs, 2000). Consequently, instruction in a learner-centred classroom has several noteworthy characteristics: (a) Students are engaged in activities that involve finding

meaning and involve complex thinking. To that end, they learn cognitive and metacognitive strategies to support thinking; (b) Students are engaged in collaborative activities to generate meaning and solve problems; (c) Students are working at appropriate levels through accommodations of their individual needs, and (d) Students are working on activities that allow them to develop self-regulation through exercise of autonomy and self-determination. (Sheppard et al., 2012, p.2)

As an extension to past research, we are interested in two questions. First, how do teachers who are considered exemplary use technology in their classrooms? Is it being used to create learner-centred environments? Second, how do teachers understand effective learning, effective classrooms and technology's role in supporting learning?

Method

This particular study utilized two methods of data collection – observations and interviews. Four school districts in an eastern Canadian province were invited to participate in the study. We asked each school district to recommend elementary or intermediate schools with exemplary teachers who were known to use technology regularly in their classrooms. Each school district nominated teachers who we then asked to participate in the study. From this nomination, 10 teachers agreed to participate—3 teachers in one district, 5 teachers in another, and 1 in each of the other two districts.

Classroom observations

Having obtained a sample of exemplary teachers, we began to study their pedagogical use of technology using naturalistic observations. In total, 32 classroom lessons with ten teachers were observed. Each teacher was observed on at least two occasions; most were observed three or four times, with one teacher being observed six times (Table 1).

Classroom observations were arranged in consultation with the teacher at a time that was convenient to the teacher and when the teacher was using technology in his/her class. During the lessons, the researcher acted as a non-participant observer. She would blend into the class taking notes of the activities of the teacher and students, including the technology being used and interactions occurring. Occasionally, the researcher would interact with students, but in general the contact was minimal. During the in-class observations, the researcher looked for evidence that technology enabled students to better access and transfer prior knowledge, provided them with

increased opportunities to demonstrate autonomous strategic self-directed learning, or enhanced the quality of their learning.

Table 1: Number of observations per teacher

Teacher	District	School	Grade	Number of observations
6		Pebble	5	4
9		Violet	6	2
10	District A	Violet	5	6
3		Holt	4	3
2		Fern	4	4
1		Bobsleigh	4	2
7	District B	Timber	4	3
8		Timber	5	3
5	District C	Paxt	4	4
4	District D	Mackerel	6	4

Transcriptions of field notes were created for each lesson observed. Summaries of each transcript were subsequently created to concisely articulate the significant events transpiring in the lesson. Two researchers reviewed these summaries and reached agreement on the match between the summaries and the field notes. After reading each summary to develop an overall sense of the activities in the classroom, we analyzed each summary to identify *meaning units* within the lesson (Rennie, Phillips & Quartaro, 1988; Dupuis, Bloom & Loughed, 2006). A meaning unit refers to a phrase or sentence that expresses a single idea (Dupuis et al. 2006), which Fischer and Wertz (1979) referred to as “a distinguishable moment in the overall experience” (cited in Halling, 2008, p.163). In this case, meaning units refer to behaviours exhibited by the teacher or student (e.g., “teacher asks question” or “student writes answer on interactive white board”). We also created meaning units to describe the type and use of the technology being referenced (e.g., “display a website” or “create a story web”).

The identification and coding of meaning units were achieved by the consensus of two of the researchers. Two researchers read the transcripts and reached agreement on the coding. The classroom observations data were coded and analyzed using QDA Miner (Provalis, 2011), a software program for analyzing qualitative data. Text segments identified as meaning units were “tagged” with a code. These codes were then analyzed in two ways. Quantitative methods provided descriptive and summary information. This was supplemented with qualitative analyses of meaning units.

Interviews

Interviews were conducted with the principals and teachers; focus groups were held with students. Interviews of teachers were arranged at a time and location convenient to the teacher. Interviews typically took place in the school and lasted approximately 30 to 60 minutes. The interviews typically took the form of a conversation between the researcher and teacher. During the conversation, questions about technology, effective learning and effective classrooms were asked. Recordings of interviews were subsequently transcribed. As with observations, the researchers analyzed the transcribed text in order to identify meaning units. In this case, a meaning unit referred to words or phrases representing teachers' described behaviours, their ideas about learning, their use of technology, and students' behaviours. Having achieved consensus between two researchers, the interview meaning units were analyzed using QDA Miner (Provalis, 2011).

Results

Using the data gathered through classroom observations, two researchers independently labelled each lesson according to two dimensions. First, each lesson was labelled according to the dominant type of classroom structure for the lesson. The emergent categories were: (a) *whole class* instruction in which the teacher led the instruction and all students participated in the same activity; (b) *independent* work in which students performed separate tasks; and (c) *activity centres* in which groups of students rotated through a set of stations of activities. Second, each lesson was described as being teacher-directed or learner-centred. In addition, teachers were categorized by their level of sophistication with using technology as either novice, comfortable or sophisticated. Data were also coded along six general themes: type of technology being used, its purpose, student actions, teacher actions, student engagement and cognitive activity.

Observations of teachers

Classroom structure

The most common classroom structure observed was the whole class setting. Twenty-one of the 32 lessons observed (66%) were considered to use a whole class setting (e.g., teacher explanations or class discussions). Eight lessons (25%) were set up as independent activity (e.g., blogging or research projects) while three (9%) involved activity centres. The most frequent subjects observed were mathematics and language arts (34% and 28% respectively). The subjects for the remaining 11 classes were

science, social studies and music (15%, 15% and 6% respectively). Ten of the 11 mathematics classes observed were whole class settings; the remaining one used activity centres. Activity centres were most likely to be set up in language arts classes while independent activities were likely to occur in language arts, science or social studies.

One-half of the teachers observed indicated that they had participated in some form of professional development concerning the creation of learner-centred classrooms. A cross-tabulation analysis of the coded data revealed that four of the six teachers who created lessons involving independent activities had received professional development training. However, two of the three teachers who used activity centres had not received professional development training. Overall, we found that teachers receiving professional development training were as likely to use a whole class setting as those who did not receive it.

What technology was being used and for what purpose?

A wide variety of technological devices were used in the lessons observed, ranging from computers and interactive white boards to mathematics manipulatives and printed materials such as encyclopaedias and dictionaries (see Table 2). The most commonly observed devices were the interactive whiteboard (25 lessons) and computers (11 lessons). A cluster analysis of the codes for technology (Figure 1) revealed three patterns of how technology was being used.

The first cluster represented lessons in which computers were used to run applications such as story mapping programs or blogging. In these lessons, students typically worked at activity centres or undertook independent activities using computers in a lab. The following excerpt is an example of this type of use of the technology:

Table 2: Technologies employed in the observed lessons

Technology used	Number of lessons
Interactive white board	25
Computers	11
Pencil and paper	8
Whiteboards	4
Print materials	2
Interactive response device	2
Manipulatives	1
Audio recorder	1
iPad	1

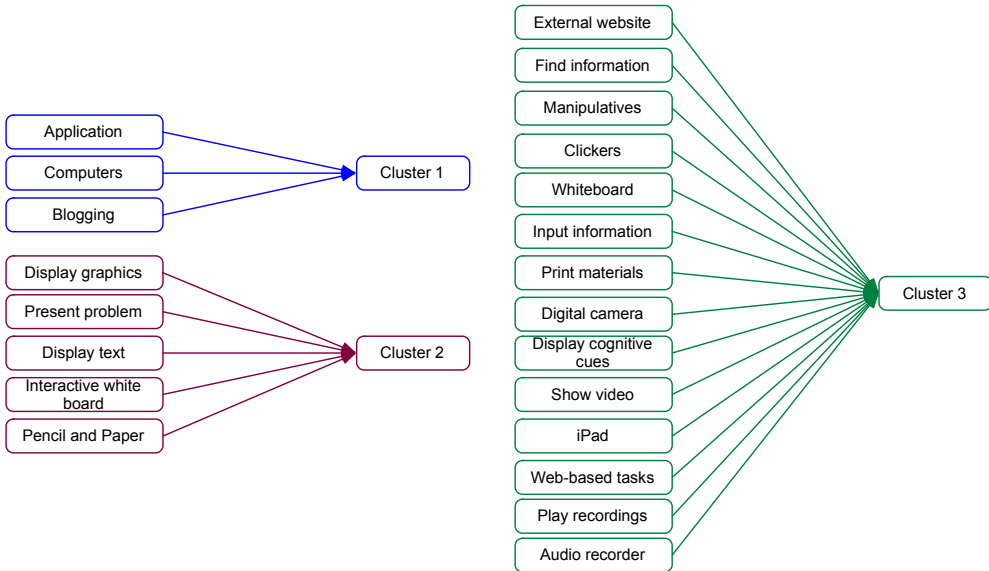


Figure 1. Cluster analysis of technology use, type and purpose

Students are assigned a computer, one per student. Students are making cartoons using a programme called Cartoon Creator. The cartoons are to depict in words and illustrations their reactions to a book they have read. ... Students have to create a cartoon as a book report. Students have choice about which book to report on; what backgrounds, characters and dialogue to use in the cartoon; and the number of panels.... When students are finished they have permission to work on their blogs–making postings or comments on other's blogs. Once they are finished the cartoon and blog, they can sign on to authorized sites. (Field notes summary: Fern, Day 3)

In most instances, the computer aided students in the creation of some artifact. The most common activity was writing which involved creating blogs and responses to blogs, or finding information and writing a report. Occasionally, students used applications to create story webs or mind maps, and in one instance students used an application to create a book report in cartoon format while in another they compared commercials and their messages by creating storyboards.

The second cluster can be described as teachers using the interactive whiteboard for displaying text or graphics, or presenting a problem. The most common use of the interactive whiteboard was for displaying information, much in the same way as using a blackboard or whiteboard. This information could be instructions for an activity, keeping a list of names on a checklist, or displaying a copy of a poem.

As an example from our observations, “the teacher put a math problem on the interactive whiteboard, students write their answers on their whiteboards. Teacher discusses strategies with students. Teacher gives them a new problem, then another” (Field notes summary: Holt, Day 3). After presenting the information, students would be asked to complete some a pencil and paper worksheet or assignment. This pattern of presentation and/or explanation followed by discussion and assignment of student work is consistent with our observation of most classes having a whole-class structure.

Although the interactive whiteboard was used frequently “as giant whiteboard” (Teacher interview: Bobsleigh), there were singular instances where it accomplished other tasks. For example, the interactive whiteboard was used to access external websites (Statistics Canada), use web-based applications (Google Earth), show a video, or play an educational game (Math Baseball). On two occasions, interactive response devices (clickers) were used to interactively input information from students that was displayed on the interactive whiteboard as a bar graph to facilitate whole-class discussion.

The third cluster represented the use of technological devices for particular purposes as singular events. For example, one teacher used interactive response devices (clickers) to generate bar graphs. Another teacher used the interactive whiteboard to record students' oral reading, while in another class the student used a digital camera to take photographs for his report.

What the teachers and students were doing

Table 3: Occurrences of observed teacher actions

Teacher action	Number of lessons
Teacher explains	17
Teacher discusses	14
Cognitive or metacognitive prompts	14
Teacher circulates	12
Teacher questions	10
Teacher models	7
Works one-on-one	2

Our analysis of teachers' actions produced results consistent with teaching practices in a whole class structure (Table 3). Teachers' explanations were the most frequently occurring teacher actions (17 of 32; 53.1%), followed by discussing (14 of 32; 43.8%) and questioning (10 of 32; 31.3%; see Table 3). However, teachers were also observed utilizing cognitive and metacognitive prompts (14 of 32; 43%). Teachers often provided students with prompts to encourage and develop thinking about their thinking as students worked on problems, demonstrated solutions or answered questions. These prompts were often reminders about executing strategies for completing a task, asking for explanations of strategies used, or discussing possible strategies for solving problems. For example, during one lesson, the "teacher asks a student to explain his strategies to the class" (Holt, Day 2). In another instance, "the teacher reminds children to practice active listening and to make connections – to make pictures in their heads – to tune in their brains (Holt, Day 4).

As with teacher behaviours, student actions were coded and the results are presented in Table 4. Given that teacher behaviours were most consistent with a whole class structure, it is not surprising that student actions were also consistent with a whole class structure. The most common student actions observed were independent work (16 of 32; 50.0%) and completing worksheets or assignments (12 of 32; 37.5%). However, students were observed to be explaining (7 of 32; 21.9%), creating (9 of 32; 28.1%) and discussing ideas (6 of 32; 18.8%). They were also seen helping each other out (8 of 32; 25%) and working together (6 of 32; 18.8%).

Table 4: Occurrences of students' actions

Student actions	Number of lessons
Students work independently	16
Students complete worksheets or assignments	12
Students help each other	8
Student demonstrates	8
Student explains	7
Students working together	6
Students working on technology	6
Students work in pairs	3
Students participate in class discussion	3
Student asks question	3
Student imitates	2

Teacher and student actions were subjected to a cluster analysis with three broad categories of teacher/student actions emerging (Figure 2) illustrates the relationship between teacher and student actions. The clusters can be interpreted as describing behaviours consistent with: (a) a whole class settings (Clusters 1a and 1b), and (b) actions that were based upon group work or activity centre (Cluster 2), and (c) teacher-directed rote learning (Cluster 3). In lessons consistent with the patterns of Cluster 1a and Cluster 1b, the teacher was seen explaining, discussing, and providing cognitive and metacognitive prompts. Student behaviour in this structure included creating and discussing ideas, providing explanations, and completing worksheets or assignments. The dominant technology used was the interactive whiteboard, which was used to provide a means of displaying information that would become the catalyst for discussion. For example:

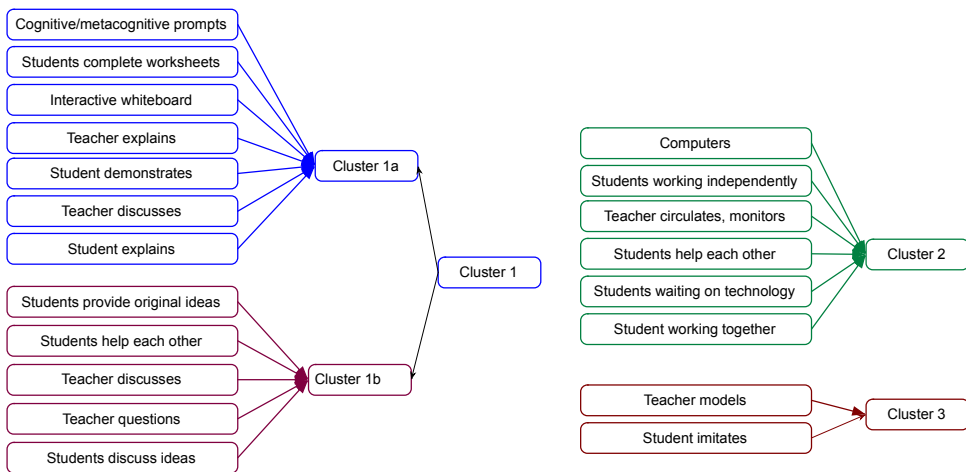


Figure 3. Results of cluster analysis of teacher and student behaviours

The teacher has a poem (In Fanders Fields) displayed on the Smartboard. She calls students' attention to the board and reads the poem. She uses features of the programme (highlight, underline, finger point) as she reads the poem. ... She asks students to think of what the words mean and what they think. A discussion ensues. (Field notes summary: Holt, Day 3).

Student engagement and thinking

As students proceeded with their work instances of both engagement and lack of engagement were observed. Students, for the most, participated in class, were engaged in their work and no discipline or behaviour issues were observed. There were a few instances where students were deeply engrossed in their work; however, there were also instances where students became disengaged, bored and disinterested. Using technology did not necessarily result in engagement:

Students work individually or with a partner. Teacher passes out math exercise books. Some students use paper and pencil only. Others use individual 8 x 10 whiteboards with whiteboard markers to try out possibilities. Students concentrate on assigned tasks and work quietly arriving at the answer. From time to time they ask for clarification from each other or the teacher (Field notes summary: Fern, Day 2).

Although using technology does not necessarily result in engagement, it could prompt thinking that leads to engagement. In one language arts class, the interactive white board was used to display information and a story-web program was used to map ideas that became the foundation for engagement:

The teacher presents a book called Frosty's New Friend. A picture of the cover is displayed on the interactive white board. The book cover and stuffed toys are props to assist with their writing activity—a demand piece. The teacher calls their attention to the illustration on the interactive white board, and they discuss ideas about what is going on in the picture. The teacher then reminds students to use their strategies for writing stories. She then calls up a program and starts creating a story web. Students express ideas and the teacher puts them in the web. She starts to circulate as students begin their stories. The students get the dictionaries from the shelves. Students check spelling. Others look for words. Some students are writing quite rapidly. Others are thinking a lot. The classroom is very quiet and the students are concentrating on their task. Some students have personal spellers and as they find new words they put them in their

personal spellers. The class ends. The students do not want to stop. It is time for recess (Field notes summary: Timber 5, Day 3).

The use of technology does not necessarily result in engagement. For instance, in one class, even though the class was structured around activity centres, one of which involved using computers, the level of sustained student engagement among individual students seemed questionable:

Students help one another. For example, when one student is having trouble signing in, another in the group helps him. As the students rotate out of the computer centre and other children arrive (this happens at different times for different students), students appear initially very excited about having a turn at the computer. As time goes on, students drift away from the computers to do other activities. Initially there is a feeling of competition for the computers, but by the end of the class there are two vacant stations.

Similarly, in a languages arts lesson being led by the teacher, students were initially engaged but eventually started to drift away:

There is a paragraph on the interactive white board. Today's lesson is about voice in writing. The teacher asks the students how the paragraph could be improved. They provide suggestions. Students are sitting, listening, looking and attending to what the teacher is saying.... The teacher tells the students they will need to use these strategies later when they are writing their paragraphs so they need to pay attention. Some students seem to be losing interest.... The teacher cautions they do not want to make their paragraph too busy. Students seem to be losing interest (Field note summary: Fern, Day 1).

In another class:

Students are using a word processor to record their information. Many students are using print materials to find their information. One girl writes out her project by hand and then types it into the template. Students discuss their animals and information, and help each other with difficulties. The teacher circulates and helps students

when they raise their hands. Students have content questions; others have technical questions about how to move objects around the page or copy pictures. The students seem to be losing interest as time progresses (Field note summary: Paxt, Day 3).

Teacher interviews and effective learning

As describe in the methods section, teachers were interviewed as well as observed. During their interviews, teachers were asked about effective learning and effective classrooms. Results from coding teachers' responses to questions about learning, classroom practice and technology are presented in Figure 3. In this diagram, labels in the boxes represent ideas identified in the teachers' protocols or variables used to describe teachers. The numbers with parentheses inside the boxes are the numbers of teachers making statements labelled by that code. The exception is the three boxes describing classroom structure; those numbers refer to the number of observed lessons corresponding to each type of structure. Line labels are the probability of an element (or code) being associated with a type of teacher (learning-centred: LC or teacher-directed: TD). Overall, teachers had surprisingly little to say about effective learning, what it is or how it occurs. In total, teachers made 64 statements identifying 41 elements (average of 6.4 and 4.1 respectively), ranging from a minimum of three statements about two elements to a maximum of nine statements about of seven elements. Teachers' responses indicated that almost all teachers thought learning was effective when students were engaged, yet there was little articulation of what this meant or how it was achieved. Most teachers also commented that effective learning occurred when students worked collaboratively, and when they were developing meaningful understanding of the content. While these ideas are consistent with the principles of learning and learner-centred classrooms that were stated previously in the paper, there was little description of these ideas, and not all teachers articulated all of these ideas.

A closer examination revealed that teachers who were learner-centred made greater numbers of statements. It was also the case that differentiated instruction, scaffolding and developing self-direction were recognized as components of effective learning by LC teachers but not by any TD teachers. Likewise, when a factor of effective learning was mentioned, it was more likely to be mentioned by an LC teacher than a TD teacher. Overall, it appears that LC teachers have a better understanding of effective learning than TD teachers. A cluster analysis of the co-occurrence of codes yielded two significant patterns. The first pattern, collaboration, engagement and understanding

were the elements of effective learning. In the second pattern, differentiated and scaffolded instruction constituted effective learning. Yet while, these two patterns of elements emerged, the actual number of teachers that fitting into each pattern is small, meaning that few teachers identified these elements concomitantly.

Teacher interviews and effective classrooms

Analysis of teachers' answers to questions about effective classrooms produced 17 elements. Most teachers recognized that providing accommodations for students, creating variety, offering choices and providing opportunities for collaboration were elements of effective classrooms. While these ideas are consistent with the principles of learner-centred classrooms, both the number of ideas expressed by teachers and the depth of articulation was low. Beyond that, there was considerable diversity in ideas about elements of effective classrooms ranging from providing opportunities for physical involvement and mobility to structures of direct teaching and promoting metacognition. What is striking to note is that when a teacher made a statement and an element identified, it was more likely to be mentioned by a teacher who was LC than TD. LC teachers made statements about 16 elements while TD teachers made statements about 10 elements. For example, while providing choice was mentioned by 8 teachers, more LC teachers mentioned it than TD teachers. Likewise, while a few teachers mentioned direct teaching as a component of an effective classroom, the teachers were more likely to be LC than TD.

The cluster analysis of co-occurrence resulted in five different patterns of ideas about effective classrooms. The first emergent pattern was that of diversity: an effective classroom offered variety, provided choice and accommodated students' needs. The second pattern was that of instruction: the effective classroom involved direct teaching, the use of activity centres and technology. Third, a management pattern was present in which the effective classroom was one in which the teacher was able to "read the students," effect smooth transitions between activities and provide feedback to students. Providing spaces for learning and opportunities for mobility emerged as the fourth pattern, while utilizing pre-assessments and access to special needs supports was the fifth pattern. While these distinct patterns were present, the actual numbers of teachers associated with each was small.

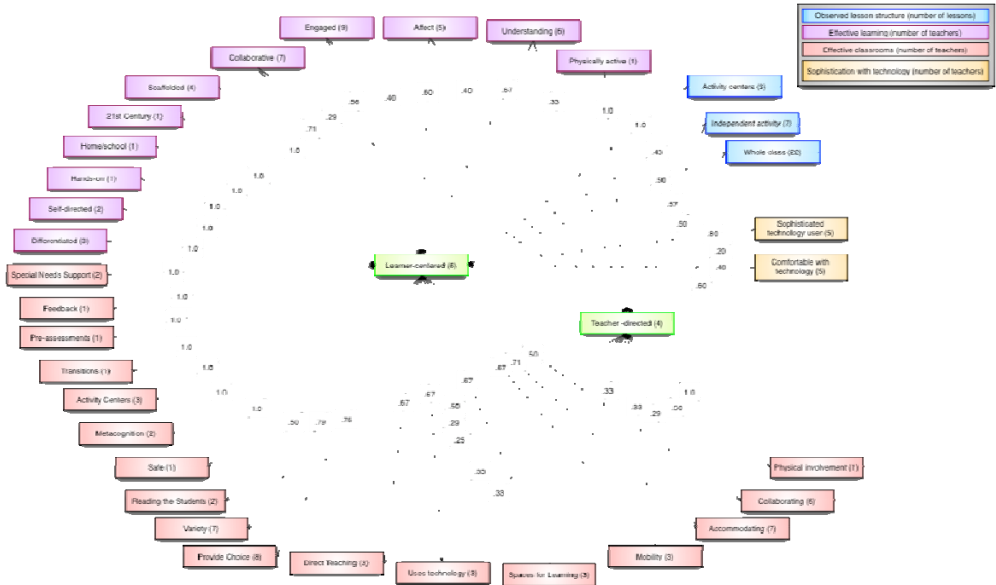


Figure 3. Statements about effective learning, effective classrooms, type of classroom structure and level of technology sophistication for learner-centered and teacher-directed teachers
 Note: The labels colour-coded boxes are observed classroom elements derived from coding (see legend). With the exception of lesson structures, numbers inside each box indicate the total number of teachers making statements labelled by that code. For lesson structures, the numbers indicate the total number of observed lessons corresponding to each type of structure. Line labels are the probability of an element being associated with teaching approach (LC or TD).

Teachers, learning and technology

Teachers were asked about questions about the use of technology in their classroom: how they plan for using technology, how they use it to adapt to students’ needs, what role it can play in learning and how it has changed their role as teachers. From our analyses, a few important highlights emerged. First, if a teacher was a sophisticated user of technology, that teacher was more likely to be an LC teacher than a TD teacher. Second, using technology to engage students in learning was the most common way in which technology could enhance learning (5 teachers). It was also noted by a number of teachers that technology can support differentiation (7 statements by LC teachers, 1 by a TD teacher) and inclusion, permit accommodation to students’ needs and allowing for greater flexibility within lessons.

Overall, there was a variety of singular explanations given for how technology could enhance learning and practice suggesting no common understanding of the application of technology to classroom practice. Yet while some teachers noted that technology can have its positive effects, it can be counterproductive as well. For example, one teacher noted that using the computer is not simply for playing games, it must be used for a specific task for a specific need. The application of technology to the lesson needs to be thought out. As a result, teachers pointed out that the use of technology has placed greater demands on them. Planning lessons and finding resources has resulted in them being *busier* and presented greater challenges.

Of the 64 statements made about the use of technology to enhance learning, only two were directly related to learning as a cognitive or thinking activity. In one instance, the teacher commented that technology can enhance creativity; in the other, the teacher stated that the teacher can be used to activate prior knowledge. This suggests that teachers may have only a superficial understanding of learning and how technology can be used to enhance learning. Indeed, one teacher commented that the technology has not changed her role as a teacher. Rather, she did her planning and preparation and if technology could support her work she would make use of it.

Discussion

Previous research has suggested that the introduction of technology into classrooms does not necessarily lead to the transformation of classroom practice. Indeed, there is an implicit assumption that the introduction of technology will result in greater student engagement and enhanced learning. Our research suggests that this is not necessarily the case. In fact, our observations suggest that there are many lessons in which students are deeply engaged and technology is not being used, and many lessons in which technology is being used for trivial purposes. Our observations showed that there are instances where technology can aid in the creation of a learner-centered classroom. Yet, there are many more instances of technology being used to support teacher-directed lessons.

In order for a transformation of classroom practice to occur, teachers need to understand the fundamental principles of learning and how technology can be used in accordance with those principles. Our findings in this study suggest that while teachers might have an intuitive sense of effective classroom practice, their articulation of what constitutes effective learning and how technology can be used to support it is superficial. Our results suggest that LC teachers had a better understanding of both

technology and learning than TD teachers. This suggests that professional development efforts should be directed towards helping teachers develop a better understanding of the learning-centred classroom and the principles of effective learning.

Our analyses have led us to believe that some teachers were using technology in ways that made conventional, primarily teacher-directed teaching more effective and efficient. Other teachers, however, perceived technology as a useful tool to facilitate student engagement and therefore designed their classrooms as learner-centred environments. Although there is no doubt that we observed both teacher-directed and learner-centred approaches to teaching and learning, those contrasting approaches fail to capture the reality of what we observed. In spite of the fact that the classrooms we visited were recommended as having exemplary teachers who were known to use technology regularly in their classrooms, our classroom observations reveal the existence of a teacher-directed/learner-centred continuum. These findings do not give us any confidence that there is anything inherent in the use of emerging computer technology that contributes to more learner-centeredness, even when the teachers who are using various technologies are considered by district personnel or their school principal to be exemplary.

These findings have important implications for district policy and professional development. Often, professional development has focused upon the technology itself rather than learning. We suggest that professional development should continue to support teachers' use of technology because teachers who were sophisticated users of technology tended to be learner-centred. But we also suggest that professional development should focus on helping teachers to develop a more sophisticated understanding of learning and the principles of the learner-centred classroom. The issue may be that teachers cannot use technology to develop a learner-centred classroom because they do not have a profound understanding of the relationship between a particular technology and learning.

This study was exploratory in nature, and has a number of limitations to be considered for future research. First, the participants were volunteers from a pool of teachers nominated as exemplary by district personnel. Consequently, the criteria for being exemplary is uncertain and, perhaps, questionable. In further studies, researchers might consider focusing on more specific criteria for the inclusion of teacher participants. Second, teachers were observed for a limited number of times within a specific time interval. This suggests that the observations were a snapshot of a very

short interval taken from a long timeline. Third, further conceptualization of the learner-centred classroom is needed. What does it mean to be learner-centred? And should, or can every lesson be learner-centred? If not, perhaps our observations were taken at an unfortunate time.

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Evaluating Learning Activities: A Design Perspective

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Abstract

This project outlines an action research project that explores how an Instructional Design department in a single-mode distance education institution can collect formative evaluation on learning activities in online learning environments. A research framework was proposed that consisted of three phases: design, analysis and evaluation. The first phase of the project was conducted to collect learning activity designs, determine the best way to represent them, and capture instructional designers' perceptions of good design. A generic template for representation was developed and will be used to create both a learning activity repository and data collection tools for the next phase of the project.

Keywords: Learning design, learning activity evaluation, praxis

Introduction

In Distributed Learning (DL) environments there is an implied separation between the learner and the learning resources, other learners and the instructor, either by time, distance, or physical space. The *glue* that binds the learning experience together, the learning environment, needs to be carefully designed to create optimal conditions. Attention has been paid to various forms of evaluation in types of learning activities in eLearning environments, (Bernard & Lundgren-Cayrol, 2001; Jahnke, 2010; Lou & Kim MacGregor, 2004) and at the same time there has been a focus on evaluating learning designs and design patterns (Agostinho, Bennet, & Lockyer, 2011). What seems to be missing in the research is a focus on how data that is collected from learners and instructors can be fed back into a process for improving and refining course design in a systematic way. This project aims to combine these two aspects by examining how an Instructional Design (ID) team can develop a meaningful process which uses learner feedback as well as professional reflection to improve their practices, policies and learning activity designs.

This action research project is situated within an instructional design department in an open learning division that develops and delivers over 400 independent-study (print and web-based) and paced-cohort online courses. The Instructional designers (IDs) are responsible for managing the development of all new courses and major revisions of existing courses, and lead teams that include contracted subject matter experts (SMEs), media developers, editors, and technical staff. There has been a shift from designing courses for individual, independent study to online, collaborative environments. This project came out of a departmental need for building formative evaluation tools to help improve the quality of the learning experiences and to more effectively gather feedback on activity designs.

This project focuses on planning, developing, implementing and then revising an evaluation process that will help determine the effectiveness of learning activities, designs and courses. As the online paced cohort model is still relatively new to the institution, the team is particularly interested in feedback on those activities which require interaction between the learners.

Departmental goals

- To develop engaging and meaningful distance learning experiences.
- To create a set of promising design patterns that work in the organizational context.
- To develop a methodology to evaluate learning activity designs/patterns so that they can be improved.

Research questions

- What are the characteristics of an effective learning design?
- What are the guiding principles and rules that the learning design team works within? How can making these principles explicit improve practice?
- Do students see the characteristics of these guiding principles and effective learning design in the courses?
- How do students perceive the value of independent and interactive / collaborative learning activities?

Literature review

Evaluation

The evaluation of learning activities and materials in technology enhanced learning and distance environments covers a wide spectrum of activity, ranging from the granular assessment of individual learning objects to individual course evaluations to extensive program evaluations that occur at an institutional level. At the institutional level, traditional forms of evaluation have focused on factors such as quality assurance, policy, overall impact of a program, context, accountability and other types of measures such as cost effectiveness, completion rates, levels of student satisfaction (of the entire experience) and course grades (Simonson, 1997). Jung (2010) argues that traditional forms of evaluation used by institutions are problematic in that they often overlook the student's perspective. In both face-to-face (F2F) and distance learning higher education environments, course evaluation usually only occurs at the end of a course, and is designed for the most part to measure teaching effectiveness, rather than the course materials. Frick, Chadha, Watson and Zlatkowska (2009) found that though end of course evaluations show a correlation between high course evaluation scores and student achievement, they often do not indicate how teaching can be improved or how learners can better attain course outcomes.

At the other end of the granularity scale, there have been many studies into the evaluation of learning objects and their effectiveness (Akpinar, 2008; Krauss & Ally, 2005). Again, little effort has been made to evaluate how these chunked activities are perceived by learners or used in the learning process. In a 2007 study, Kay and Knaack note that in a review of 58 articles on learning objects, only 11 studies focused on evaluation and, of those, only two examined the actual impact on the learning itself. Noting this absence of research, Kay (2011) developed a model to evaluate what was termed *web-based learning tools* (WBLT, also known as learning objects) using a three-pronged approach, which included learning, design, and engagement. Another research focus has been on student perceptions and practices around certain types of activities, such as online discussions, role-playing, and computer mediated project-based learning, to name a few. These types of studies focus on collecting data from a variety of sources, including student surveys, interviews and content analysis, and often provide recommendations for procedures, design improvements and facilitation. In one example, Beckett, Amaro-Jiménez and Beckett (2010) examined graduate students uses of online asynchronous discussions (OADs) and found that though most

students perceived them as useful, they were also often disappointed and frustrated by the lack of teaching presence. Through the findings of their study on computer conferencing, Bernard and Lundgren-Cayro (2001) developed a matrix that outlined different stages and components of collaborative online learning, which could then be used as a framework during the design process. The results of these types of studies highlight the effectiveness of different pedagogical approaches and can provide a basis for theoretically generated design principles which provide suggestions for evidence-based change. They don't, however, provide a feasible model for evaluating course activities and materials on an ongoing basis as part of constant improvement cycle for change – one of the aims of this project.

Though there is an expansive body of literature on learning design development, very little research specifically targets *evaluating* learning designs or activities, particularly from the learner's perspective. In their Mod4L project report, Falconer, Beetham, Oliver and Littlejohn (2007), outline their use of a wiki for *instructors* to evaluate a set of learning designs. Laurillard (2008) proposes a framework, but again, this focuses on designers, educational technologists and instructors evaluating learning designs, with a focus on pedagogy which, though beneficial, does not include the learner perspective. Noting that many of the evaluation frameworks that have been developed focus on some aspect of the materials, such as intention, use, learning outcome or other, but not all, Bundsgaard and Hansen (2011) propose a holistic framework that focuses on two separate concepts, learning materials (artifacts) and designs for learning (which they define as how these artifacts are then organized and articulated, in space and time, to support learning). Their three-step evaluation approach examines the (a) *potential for learning* (the affordances and challenges of the materials and proposed competencies), (b) the *actualized learning potential* (the potential for learning when the design is enacted as planned for a given context) and (c) *the actual learning* (whether or not learners meet the proposed competencies). They suggest the complex framework be used as a heuristic for design – as a method that could “investigate and demonstrate under which specific circumstances learning materials actually work in real settings” (p.42). Another recent study by McNaught, Lam and Cheng (2011) may also provide insight as their model uses a combination of an evaluative matrix of the learning design, student questionnaires, and an evaluation of student achievement on an embedded authentic task. For our purposes these models might outline a much briefer exploration, and could provide a basis for gathering evidence to validate whether or not a planned learning sequence was actually realized by learners.

The literature confirms that evaluation is an important process, but many of the tools and methods that are currently used are not appropriate for our context because they are either too broad, too granular or don't include a learner perspective.

Design practice

Campbell, Schwier and Kenny (2006) frame instructional design as “an active practice based on community, practical reasoning, personal perspective, and semantic innovation involving memory and leading to action” (p. 15). Instructional Designers need to be flexible and reflexive, creative and structured, and open and responsive to new ideas, technologies, theories and complex situations. As many have pointed out, design is messy, complicated, full of “wicked problems” and often improved through discussion, reflection, and criticism (Goodyear & Retalis, 2010).

How do successful designers wade through this complexity? Early literature on Instructional Design highlighted the use of systematic models such as ADDIE (Analysis, Design, Develop, Implement, Evaluate) or Systematic Design of Instruction (Dick, Carey & Carey, 2001). More recent research has found that designers, particularly those who are experienced, often use a more eclectic and responsive approach to their design tasks. Campbell et al., 2006 argue that traditional models such as ADDIE, restrict the design process rather than foster creative processes and state that “‘messiness’ should not be a problem to overcome but should lead to a stimulating environment...” (p.15). York and Ertmer (2011) echo their findings, and in their research on ID uses of heuristics found that few experienced IDs mentioned the use of models.

Yanchar and Gabbitas (2010) highlight that current design practice can be characterized as *eclectic*, where in practice designers create a *conceptual toolkit* which includes theory, models, principles and philosophical frameworks used to make decisions. They argue that we need to go even deeper and critically examine what they term *design sense* through a “critical dialogue where there may be a clash of divergent views” (p.390). They suggest through conversations with SMEs, exploration of the literature or, as we are exploring in this project, through direct feedback from stakeholders such as the learners, a ‘critical flexibility’ can occur within the design team.

So how do instructional designers incorporate this critical turn in their practice? In their research interviews with designers, Williams, South, Yanchar, Wilson and Allen (2011) were told by one participant that “evaluation is dead” and many participants

indicated that clients and stakeholders were no longer interested or would invest in summative or product evaluations. Their explorations revealed, not surprisingly, that evaluation is built into all aspects of a designer’s practice: “Instructional designers are learners who are trying to help learners while they collaboratively face complex ecologies and rapidly changing circumstance” (Williams, et al., p.904). In this project we aim to structure and formalize an inherently tacit reflection and evaluation process.

Methodology

We chose an action research approach because educational problems are situated, complex, multi-dimensional, and often related to one’s own practice. Effective educational research needs to be iterative and “develop into a participatory and collaborative process of deepening reflection, more controlled and critical practice and the establishment of more educationally defensible situations and institutions” (Carr & Kemmis, 1986, p.185). In this project, we need to go beyond where most traditional research stops, and plan an *action* phase where policies/plans, procedures, and programs emerge (McPherson & Nunes, 2004).

The following project research framework (Figure 1) outlines three distinct phases of research activity.

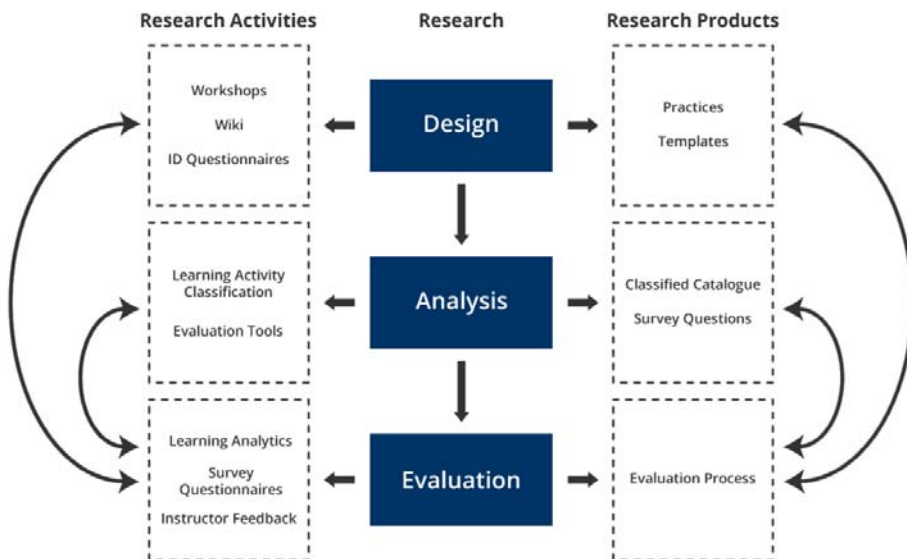


Figure 1. Action Research Framework for three phases of project

1. Design: Determine current design practices
 - Collect activity designs, determine the characteristics, when/why they are successful, facilitator and learner requirements.
 - Create an activity repository and generic template catalogue that allows learning designs to be shared and used with course development teams.
 - Continue to add to the learning activity design repository. This phase will be continuous and iterative and can be built into the professional development practices for the instructional design department.
2. Activity Analysis
 - Using the characteristics outlined in the first phase of the project, create a catalogue of activities that will be evaluated with facilitators and learners.
 - Determine survey questions for evaluation tools, the types of analytics that need to be gathered, and further questions for facilitator/learner focus groups.
3. Learning Activity Evaluation
 - Analytics-activity data from LMS that demonstrates learner and facilitator engagement, activity levels, etc.
 - Activity feedback from the learners and instructors from survey questionnaires.
 - Follow-up with structured feedback from facilitators.

As Cohen, Manion and Morrison (2011) point out, action research is a “systematic learning process ... open to surprises and opportunities” (p.300). Through our systematic approach in each of the phases we have re-evaluated our questions (previous outcomes and literature review), created a tentative plan (what data do we need and how can we collect it) and then taken action (further development of activity templates, development and delivery of questionnaires, workshops).

Data collection methods

We incorporated two methods of data collection: workshops and learner surveys. During workshops with our ID team, we used a wiki to collect data to evaluate good design practice and the effectiveness of learning activities from a designer practice, arriving at some guiding principles for design. We administered learner surveys to all students enrolled in online, paced courses over two semesters (402 students in 31 different courses), asking them to comment on the general course structure and the

value of the independent and interactive learning activities. We received 113 student responses and collated the data (frequency tables, graphs and comments) to share with the ID department. We then held further workshops to engage in a discussion of how to incorporate this learner feedback into future practice and design and to develop templates of successful learning activities. We critically examined Yanchar and Gabbitas' (2010) *design sense* to achieve a *critical flexibility* which would in turn be incorporated into our practice. A follow up survey questionnaire, with five open-ended questions, was then sent via email to get ID perspectives. An open-source CAQDAS software tool, Weft QDA, was then used by the researcher to code the ID responses to look for themes.

Findings and data analysis

Learner surveys

Though the learner data is of great interest in and of itself, and worth a more thorough analysis, as the focus of this study was how an ID team could use this data to evaluate learning design, only a short overview of the results of the learner responses will be included here.

Closed-response questions

As Cohen, Manion and Morrison (2007) suggest, exploratory data frequency tables and cross-tabulations can provide a good overall view of the data. The visual frequency tables tell us that generally the learners feel that the activities in the courses are contributing to their learning, are relevant, well organized, well-spaced and a good use of their time, thereby exemplifying the guiding principles and characteristics of good learning design identified by the ID team. The tabular data provide the frequency of responses, but it is also interesting to look at percentages, and the visual representation provided in Tableau®, gives a better overall sense of the trends in the data and allows the user to manipulate the data, isolate the responses for specific courses, or groups of courses (by program or major), and then compare and contrast the data between categories.

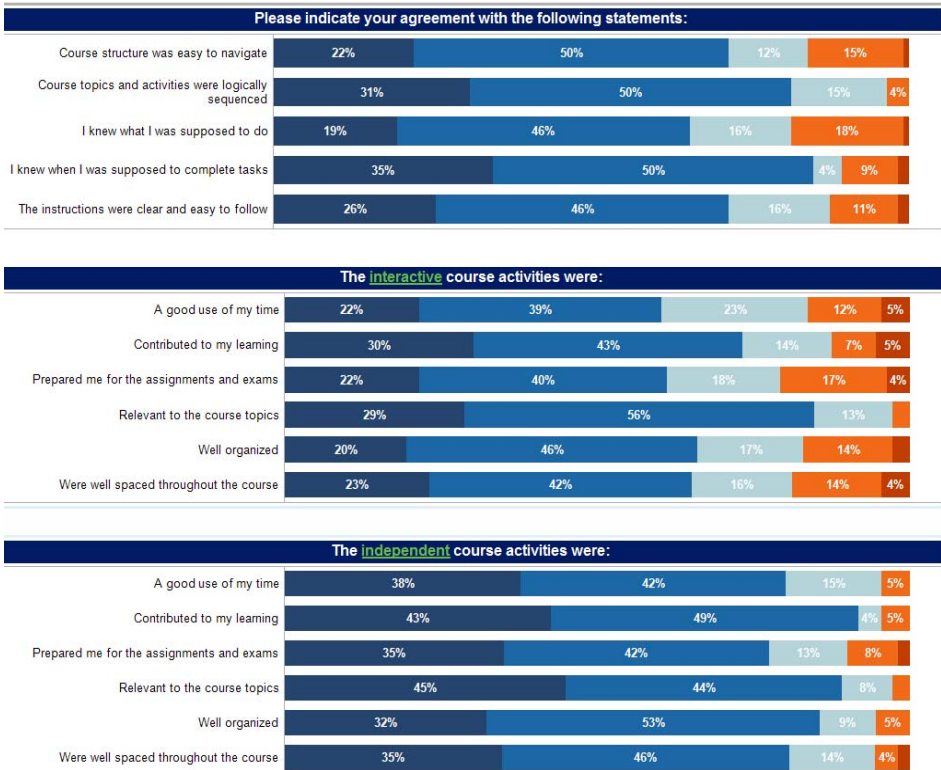


Figure 2. Dashboard view in Tableau®, showing overall frequency percentages of student responses.

Overall we can see that most respondents *Strongly agreed* or *Agreed* with the statements about their courses. Interestingly, learners were more positive about the relevance of the independent activities vs. the interactive activities. There were no *Strongly disagree* responses for the independent activities, and a higher percentage of students rated these positively (SA or A, 84%), than the interactive activities (69%). If you compare only the statements “Independent/Interactive activities were a good use of my time” you can see a significant difference – 80% positive responses (SA and A) for independent activities vs. 61% for the interactive activities. To determine the underlying causes of these differences, we would need to probe more deeply, which is reflected in the ID responses to the data (discussed further in the next section). However, these responses raise questions about the perceived value of interactive activities and could have an impact on future design, leading the ID team to be more

explicit about the nature and value of collaboration or to be even more selective about the inclusion of these activities.

Open-ended questions

Learners identified course structure (sequencing, clarity of instructions, pacing/timing) as strengths, reflecting the IDs own guiding principles. They also saw the following activity types as most useful: linking, formal assessments, discussions, reading, applied, reflective and independent. Interactivity was also seen as a valued part of the courses.

Paradoxically, when asked to comment on the least useful activities, learners included course content (course topics, workload and resources often commenting about there being too much work or content) and interactive (discussion forums, group projects) and reflective activities.

What stood out for most of the IDs was that the most comments, both positive and negative, were about interactivity. Learners were polarized on whether or not they found discussions, group projects and group tasks, such as problem solving, a good use of their time. Though not a surprising result, it is a topic that many of the ID participants identified as needing further exploration

Values of current design practices

On average 75% of learner respondents felt that the courses met their needs, they knew what they needed to do, and the activities helped them meet their outcomes. In viewing this frequency data, both in the workshop and then individually, the IDs reported that overall they felt this indicated our designs result in good quality courses.

In the questionnaire Instructional Designers were first asked to reflect on what the data revealed about core design values. The following principles were highlighted by more than one designer:

- Clarity and Organization – clear instructions, logically organized, well sequenced, well spaced activities.
- Relevance – activities are relevant and tied to learning outcomes.
- Variety – blend of individual and interactive activities, there is a value placed on interaction.
- Student focused – cognizant of student workload issues.

- Awareness – of instructor impacts, workload and requirement to communicate design intentions.

As one participant highlighted, the ID group value the following:

“Consistent instructions, activities and assignments, logically sequenced design, relevant, interspaced, well organized activities which build skills or prepare students for the assignments, inclusion of activities which promote student interaction.”

This isn't surprising as our team consists of a core group of experienced professionals, all of whom have been educators for a minimum of ten years. In a recent review of the literature on design principles, MacLean and Scott (2011) echoed some of the above elements of a learning design cycle which includes ten steps, many of which are included in the above core principles list: needs analysis, learning outcomes, course structure (sequencing, organization), specify content, overall design (mapping to learning outcomes), students and tutors (supported by induction procedures), assessment strategies, development (coordination of team), implementation (plan for maintenance and management, accessibility), and finally evaluation (strategy).

Conclusions and reflection

The learner questionnaire data provided the IDs with insights into processes and student perceptions of the courses. This data give a preliminary impression that the ID team's core design principles are resulting in courses that are clear, well organized, relevant, have a variety of interactive and independent activities and that there is an awareness of student workload and instructor requirements. ID responses indicate a shared interest in personal and departmental improvement through sharing, discussion, reflection and planned creative action (*praxis*, as defined by Smith (2011)). Almost all the ID responses had reflective elements or ideas for improvement. As one participant highlighted,

“I think the best practice in any profession comes from praxis, the application of a theory or idea within a field of practice, analysis of that practice, reflection, improved application, etc...This type of study promotes this type of continuous improvement.”

The ID team was willing to engage in what Yanchar and Gabbitas (2010) call *critical flexibility*, characterized as a type of practice-oriented inquiry, *the antithesis of habit*, that can help designers “avoid complacency...and seek a deeper, possibly transformed, understanding of what they do and why they do it” (p.319).

This research signifies initial steps to build a formative evaluation process that will provide direct feedback on the learning activity and designs. A need for more specifically targeted data was identified, as IDs were interested in how learners perceive and interact with certain types of activities (i.e. group projects, or a series of online discussions), as well as in sequencing and discipline specific issues.

Future goals

In reflections on the learner data, the ID team identified some core design principles. These can now be used, along with the other factors that were outlined as areas of interest for change (processes, practices, outcomes), to develop a formal set of core principles for guiding design practice. The learner feedback data was shown to be an important factor when reflecting on practice, as designers examined their basic assumptions about what and why activities are successful, but other factors, such as those that can outline how to improve processes (sharing with colleagues, developing activity templates) will also need to be taken into consideration when building a reflective model for change. Williams et al. (2011) support the notion that there is value in formalizing the implicit evaluation tasks that IDs perform in their everyday practice, stating “A willingness to identify and negotiate with stakeholders, perform needs analyses, conduct pilot tests, modify based on feedback, and complete other activities associated with more formalized evaluation could facilitate the process of producing quality instruction, even when formal evaluation was not feasible” (p.905).

This research project has also had an effect on policy and action, informing a new process for evaluating learning design at the course level. This research survey has been revised and is intended to be administered to students after a course has been offered the first time. Instructional designers will combine this information with feedback from the Open Learning faculty member who facilitated the course and a review of learning analytics from the learning management system. Designers will use this information to make revisions to improve the quality of the course and the learning experience.

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Culture-specific Perceptions of Motivation and Implications for Technology Enhanced Learning

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Abstract

The aim of our research is finding measures to preserve the learners' initial motivation in educational settings. For that we need to avoid conflicting situations that possibly could jeopardize their joy of learning. In our thematically comprehensive *Learning Culture Survey*, we investigate the cultural biasing of students' attitudes, behaviours, and expectations towards education. Particularly in times of massive international migration and growing numbers of refugees, the relevance to deeply understand cultural aspects in education increases. Just with this understanding, we can raise the awareness towards more cultural tolerance across all involved stakeholder groups and thus, foster the development of more culture-sensitive educational approaches. In this paper we focus on the most relevant aspect of motivation and comparatively discuss our study conducted in Germany and South Korea.

Abstract in German

Mit unserer Forschung wollen wir Maßnahmen finden, die dazu beitragen, die anfängliche Motivation von Lernern in Bildungsmaßnahmen zu bewahren. Zu diesem Zweck müssen Konfliktsituationen möglichst vermieden werden, wenn sie das Potential haben, ihnen die Freude am Lernen zu verderben. In unserem thematisch breitgefächerten *Learning Culture Survey* (Untersuchung von Lernkultur), untersuchen wir bei Lernern das Vorhandensein und den Einfluss kulturspezifischer Prägungen auf deren Verhaltensweisen, Gewohnheiten und Erwartungen bzgl. Bildung. Besonders in Zeiten massiver internationaler Migration und steigender Zahlen von Flüchtlingen wächst der Bedarf nach entsprechender Forschung stetig an. Nur wenn wir die Zusammenhänge zwischen Lernen und Kultur ausreichend verstehen, sind wir in der Lage, auf allen Ebenen die Entwicklung des erforderlichen Bewusstseins bzgl. kultursensibler Bildungsansätze zu fördern. In diesem Beitrag konzentrieren wir uns auf den sehr wichtigen Aspekt *Motivation* und diskutieren die Ergebnisse, die wir in unserer vergleichenden Studie in Deutschland und Südkorea erzielt haben.

Keywords: Motivation, E-Learning, Learning Culture Survey, Culture, Education, Intercultural Education

Introduction

Some semesters ago, we had two excellent Chinese guest students at our university who passed all exams with high scores except one, in which both failed. The significant difference between the failed exam and the perfectly managed others was that in this failed one, the students were asked to take a critical position against the taught contents. If we had foreseen their culturally specific reaction, we could have properly prepared them regarding our both countries' different concepts of learning (critical examination vs. reproduction) and understanding of respect towards instructors (consulting/guiding instructor vs. person of authority): In this particular exam, the students refused the completion because they feared to offend their lecturer when criticizing him or his choice of contents. After a short discussion of the theoretical background of this paper, we will come back to the issue of this example.

In E-Learning scenarios, learning is understood as a self-directed process (Rey, 2009, p.33). Schwartz and Bilsky, (1987, p.552) describe *self-direction* as referring "to reliance on and gratification from one's independent capacities for decision-making, creativity and action". Konrad and Traub (1999, p.13) introduce *self-directed learning* as a form of learning, in which the learner (depending on the kind of his motivation) decides himself which methods are to be taken in order to check, control, and evaluate the own learning process. Lenartowicz and Roth (2001, p.311) write that "self-directed individuals rely on themselves for achieving desired outcomes".

In such a self-directed educational scenario, a constantly high level of motivation is the most crucial success factor (Richter & Adelsberger 2011, p.1603). If learners lose their motivation in a face-to-face scenario, the educator still has a chance to recognize it and to intervene and support the regain of motivation (Rothkrantz et al., 2009, p.1). In e-Learning scenarios, this chance rarely is given; without recognizing the learners' mimics and gestures as tools to communicate satisfaction or frustration (Sandanayake & Madurapperuma, 2011, p.72), the instructors depend on the explicit communication of threats against the motivation of the learners. Ways to achieve a bit more control over the level of motivation of the learners are monitoring their efforts (Jain, 2002) and/or keeping their motivation on a high level by providing a learning situation that does not jeopardize the learners' pace.

While there is a high number of publications available which theoretically and experimentally investigate the questions what learners understand as being motivating and which activities eventually raise motivation (e.g. Dörnyei, 1994; Williams & Burden, 1997), research of influences that lead to decreasing motivation is rare. Nilsen (2009, p.546) argues if raising motivation should be put above preserving the initial motivation of learners. In his study (2006), Nilsen found that the main reasons for students' dropping out were ineffective study strategies, a mismatch between expectations and content in the study-program, and a lack of motivation. Bowman (2007, p.81) even claims that strong efforts should be made in order not to *destroy* the initial motivation by confronting the learners with unnecessary conflicts. Following Haberman (1995, p.22), it is not in the responsibility of the learners to adapt the given conditions of their learning context, but the educational institutions' duty to ensure that a learning environment supports productive learning for any kind and type of learner.

Regarding the treatment of the learners' motivation, parallels to once common practices in the healthcare sector appear to exist: As long as a learner is considered being motivated (healthy), nothing is to be done. If a learner shows symptoms for losing motivation (acutely ill), he is being encouraged in order to bring him back on track. Once a learner is considered having become wilful ignorant against motivation-supporting efforts (chronically ill), no particular activities to solve the problem are taken anymore; instead, symptoms are combated, e.g., bored learners in classrooms are demanded not to disturb others or are "simply" excluded from the lecture. For the sector of health care, this model can be considered being more or less out-dated, as many health policies implemented programs to strengthen and preserve health, e.g., through fostering sportive exercises, raising peoples' understanding of healthy nutrition, and setting up programs to avoid/deal with stress. Transferring this change from reactive to proactive health care (Menne, 2005) to the educational sector would mean to strongly support initially high-motivated learners not to lose their motivation. In order to get a better understanding of factors that could jeopardize the learners' motivation in intercultural learning scenarios, the standardized questionnaire *Learning Culture* was implemented. In the context of this questionnaire, learners were investigated regarding their attitudes towards motivation. In the following, the questionnaire is briefly introduced alongside with the setting of the bi-national study. Eventually, found results are discussed and finally conclusions taken.

Operationalization

We analysed the literature on reported conflict situations in international and/or intercultural learning scenarios. Additionally, we held informal interviews with students in Germany and South Korea in order to find further (yet unreported) influence factors that, from the students' perspective, cause whatever kinds of conflicts in their learning processes. The results of both eventually led to the operationalization of our *Learning Culture* questionnaire.

Regarding motivation, we first wanted to understand how students assess their motivational predispositions towards outer influences. Second, we were interested in answering the question why students learn and thus, which expectations regarding the taught contents they may have. Third, the students' strategies towards difficult and/or unmanageable tasks were focused. In the interviews, we found that some students considered the latter aspect being most discouraging. We assumed that if instructors understood those three types of influence factors from the perspective of the students and additionally, were aware of possible cultural differences, they could improve their support in order to foster and preserve the students' motivation on the one hand and have a more differentiated perspective how to prepare foreign students (and themselves) and evaluate unexpected results on the other hand. We asked the students to assess the following statements on a four-point Likert scale:

1. How would you describe your personal level of motivation?
 - a. I easily can be encouraged from others or situations.
 - b. I easily can be discouraged from others or situations.
2. Which of the following aspects do you consider being motivating for you within learning processes? I experience as motivating ...
 - a. if the imparted knowledge is useful/valuable for my (private/workaday) life.
 - b. if the imparted knowledge contributes to my personality development.
 - c. if the imparted knowledge improves my chances on the job market.
 - d. if I deliberately can select the learning content / topic.
 - e. if the imparted knowledge is strongly needed for upcoming examinations / tests / presentations.
 - f. if my professor/employer instructs me to acquire this knowledge.

3. If you feel discouraged because of a seemingly unmanageable task, how do you revive your motivation?
 - a. I take a rest in order to free my mind and continue later on.
 - b. I force myself to stick to the task in order to solve the problem.
 - c. I generally finish such tasks unsolved.
 - d. I look for possible support (persons, literature, and others).
 - e. I turn to different work first and later on return to the difficult task.
 - f. If the task is dividable into subtasks, I confine myself on the subtasks that I can manage and ignore those I cannot.
 - g. If the task is dividable into subtasks, I confine myself on subtasks I am personally interested in and later on get back to the difficult tasks.

After having completed several layers of test studies on understandability and appropriateness, the questionnaire was translated from English to German and Korean. The Korean version of the questionnaire additionally was retranslated to English in order to ensure the correctness of its translation (German is the first language of the authors). We initially chose the both countries Germany and South Korea due to several reasons: Germany and South Korea are considered having a more or less homogenous culture (Ziltener, 2006), and they have a single national language (Leonardi, 2002, p.314). The technological infrastructure and common economical situation in both countries is similar. Both countries are considered being culturally very different which makes differences appear more obvious: South Korea is a traditional collectivist Asian country while Germany is a very individualistic western country (Hofstede & Hofstede, 2005, p.43, p.79).

Survey setting

In disbelief of the still frequently adapted theory that culture generally is a national phenomenon (Montesquieu, 1748, p.310), we had to determine the scope of the received data (transferability) and particularly wanted to find out if the investigated items actually were culturally biased. For our research, we adopted the culture definition from Oetting (1993, p.41) who defines culture as “the customs, beliefs, social structure, and activities of any group of people who share a common identification and who would label themselves as members of that group”. According to this definition, ‘culture’ is a society-specific majority criterion. In order to avoid blurring, we defined a vast majority (60%) as general requirement to assign a cultural background to found results regarding a selected phenomenon. In order to determine

the society, which was responsible for the cultural biasing, we implemented the study in an in-depth design in the German context: We had and took the chance to send mass e-Mails inviting all students of three German universities (in different regions) to participate in our Learning Culture survey. The response rate of the students was between 2.5-7%, which is quite typical for online-surveys. We received 1817 (2400 total) fully completed questionnaires from the German students; the distribution of the data within each university allowed us to distinguish between the different study fields (in the following, we use the term *faculties*). This enabled us to determine which social/organizational context's culture was the actual driver for the students' answers, the faculty, the university, or the nation. In South Korea, in contrast to the in-depth design we applied in Germany, we focused on a broad overview and investigated students from 39 universities in and around Seoul (the large area of Seoul covers about 50% of all inhabitants of South Korea). The questionnaire in Korea was distributed in paper form, as, due legal reasons and different to the German context, we did not get access to the e-mail distribution systems of the universities. In order to reach students from a high number of universities (broad design), we conducted the Learning Culture survey in the subway system of Seoul, following a random route algorithm (Kromrey, 2006, p.309-310) for the choice of participants. In South Korea, we received 286 (325 total) fully completed questionnaires (non-response rate ~50%).

Findings

In the German university context (Ger.), we found a slight diversity in the answers between the faculties within universities, but those rarely were higher than the average answer spectrum (~20%). However, the general answer patterns were very homogenous between the universities as well as between the faculties. In the South Korean context, we were able to separately analyse the results within nine universities (due to the numbers of response). We found very similar answer patterns at both levels, within each investigated university as well as on the Korean national level. A single Korean university showed significant differences to the others. After further investigation we found that in contrast to all others in our sample, this particular one was designed for extra-occupational education. In Germany, we additionally investigated large companies in order to determine if our results could be generalized to all educational sectors and found significant differences (Richter & Adelsberger, 2012) to the results in Higher Education (HE). The HE-results of the *Learning Culture* questionnaire items of the motivation-block are shown in Figure 1.

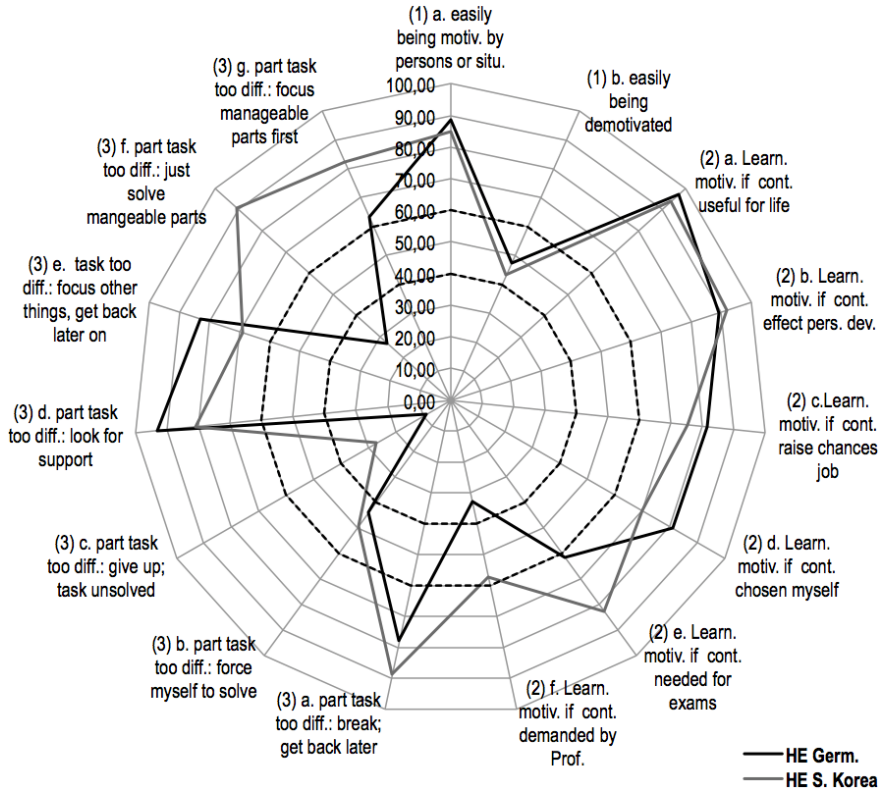


Figure 1. Learning Culture Survey: Motivation of HE students in Germany and South Korea

We binarized the data from our four point Likert scale in order to receive percentage values, which represent positive and negative answers. In the net-diagram (Figure 1), the average percentage values of the students’ positive answers regarding each of the items are displayed per country (Germany, black line; South Korea, grey line). Please note that just such points represent defined values where the curves cross each item’s axis. We chose the net-diagram for displaying the results because it allows us to identify answer patterns and related differences on sight by distinguishing shapes. As per our definition, cultural biasing is to be considered if at least 60% of the answers in a context are positive or negative, both, the 40% and the 60% level are highlighted in Figure 1.

Regarding some items, we found significant differences between the investigated contexts. However, in contrast to other topics we investigated, such as the students’ expectations towards instructor-support (Richter, 2012a) or the students’ attitudes towards time management (Richter, 2012b), the patterns between both countries are quite similar regarding our question block on motivation. In each investigated context,

an answer spectrum of 20-30% (extreme values) is common (in Figure 1, the averages are displayed) while clear results (95%-100%) have just been found in a small number of the in total 102 investigated items. Where we found strong differences regarding motivation was in the students' strategy how to deal with tasks that appear overburdening: The Korean students seem to limit their solutions on the manageable parts (90.88%) while the German students rather stick to the whole task (26.78%). The students in both countries expressed that they easily can be encouraged (88.59% Ger.; 84.97% SK). The level how far students are able to stick to a too difficult task, forcing themselves to find a proper solution and how quick they feel discouraged by outer influences seem to be individually different (for both between 40%-60%). Regarding the purpose of learning particular contents, the students in both national contexts reported that they experience learning as motivating, if the contents are valuable to either their life (96.96% Ger.; 93.71% SK) or personal development (89.25% Ger.; 91.96% SK) in general. Differences between both contexts were found in the more specific questions: The German students experience it more motivating than the Korean students, if they can choose the contents themselves (81.00% Ger.; 69.93% SK). In return, the Korean students seem to understand acquiring particular knowledge as motivating when demanded from the lecturer/professor (57.34%), which is not the case for the German students (32.81%). In addition, the Korean students appear to focus their learning efforts on the exams (target orientation) as they experience taught contents as motivating if needed for an exam (80%). As for the German students, the exam surely plays a role, but just 61.69% of the German students experience the requirement of an exam as a satisfying reason to learn particular contents. The majority of students reported not to leave a too difficult task completely unfinished (give up). However, leaving a task partly unfinished seems rather to be an acceptable option for the Korean students (27.02%) than for the German students (8.69%). Both countries' students proactively look for support if they do not find an appropriate solution (93.26% Ger.; 81.05% SK). Regarding the strategy to deal with an unmanageable task, the German students appear rather to distract themselves with completely different things (82.99%; SK 69.12%). In contrast, the Korean students rather focus on the manageable parts of this task (82.49% SK.; 63.22% Ger.).

Limitations

Our so far collected culture-related data cannot be generalized to all learning scenarios within a national context. In Germany, we conducted the survey in the contexts of Higher Education as well as vocational training. In contradiction to the general national culture approach of Hofstede and Hofstede (2005) that follows the culture

concept of Montesquieu, we found occasional disparities between different company-contexts (company culture seems to affect learning culture) but significant differences when comparing university results with results from companies (Richter & Adelsberger, 2012). We did not yet try to implement our survey on school level; due legal reasons, this revealed extremely difficult within the German context. However, for children below the age of twelve years, there are hints that their natural curiosity has a higher impact on their attitudes than their cultural biasing (Buehler et al., 2012). Although within each investigated context, the results from all investigated universities were similar to each other, generalization on national level is problematic as soon as different languages are spoken (see Leonardi, 2002, p.314). In a small-scale test study, we investigated students in the French and the British language parts of Cameroon and found significant differences (per a priori analysis) between both contexts. Even though the numbers we achieved are far from being representative, the result is a hint on what may be expected. In order to approve such phenomena, we need to investigate further countries in which different national languages are spoken or former politically distinct regions were merged, e.g., in the context of colonization.

Future research

Besides the finalized versions in German, English, and Korean, the questionnaire has been translated to Bulgarian, French, Russian, and Turkish but apart of the French version, not yet retranslated for verification and improvement. We were able to carry out small-size studies (~35-55) in Bulgaria, Cameroon, Ukraine, and Turkey. Another study was implemented in Ghana (306 sample elements, one university). The small size studies are suitable for evaluating the cultural appropriateness of the questionnaire, as well as to gain a first impression on what is to be expected when conducting large-size and/or more distinct studies. For the next steps, we need strong voluntary support from the community regarding translations and retranslations of the questionnaire as well as by providing access to students. As extension of the Learning Culture survey, we developed a metadata-set (~170 attributes) to describe educational contexts (Richter & McPherson, 2012) and already collected corresponding data in order to ensure the appropriateness of this metadata set. We right now are working on a first implementation of a publicly available database, which includes both, the data from the Learning Culture survey as well as from the contextual investigation. With this database, we aim to foster the stakeholders' understanding of cultural differences in order to reduce unnecessary learning conflicts. We further on think that linking/matching learning resources with their corresponding (national) datasets could strongly support users when searching

contents and having to decide about their appropriateness and adaptation needs. We still need to achieve a better understanding particularly regarding multilingual countries (e.g., India), urban environments (more different language versions need to be available), and indigenous societies, which too often are treated as ignorable sub-societies within nations.

Conclusion

For this paper, we focused on the thematic block *motivation* of our Questionnaire *Learning Culture Survey* and analysed how the students evaluated their own motivational predispositions towards outer influences, their purpose of learning and affections towards particular knowledge, and their strategies to deal with educational tasks that appear unmanageable or too difficult for them.

In the presented bi-national study we unexpectedly found little significant differences between the answers. For such burning issues like having to provide language training to a very large number of refugees within the shortest possible time in order to foster their integration, this is quite a releasing message.

From the results, we can derive some general recommendations: The students from both contexts stated that it does not take much to being motivated. In our questionnaire block on feedback (not included here), all students reported experiencing laud as highly motivating; good work results thus should not be taken for granted but explicitly and repeatedly acknowledged (Richter, 2012c). This already might encourage students at all motivational levels; the already motivated, those who need encouragement, as well as those who appear wilful ignorant. As most students stated that they are not easily discouraged, delivering clear information on demands and expectations at the beginning of a course/program could make the difference between acceptance/adoption of/to existing context-related rules and frustration. It actually could help learners to keep their initial motivation during the course of a program or learning entity: The Korean system is seemingly more open towards accepting partial results than the German system. Korean students appear to gain motivation when particular knowledge is demanded by instructors and useful for exams. German students, in contrast, prefer understanding the benefits and like to influence the choice of contents. As for German teachers teaching foreign learners, while it surely is useful to properly inform the learners about all conditions within an educational setting, it still appears necessary to prove a certain measure of flexibility in the application of rules.

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Digital Storytelling as a Reflective Practice Tool in a Community of Professionals

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Best Research Paper Award Winner

Abstract

This exploratory study is based on an ethnographic research about a group of food safety professionals (physicians, veterinarians, biologists, chemists, nutritionists and prevention technicians) that try to exchange information and solve critical work issues communicating their experiences in the form of digital stories. In fact they convey more detailed context than textual and verbal stories, facilitating tacit knowledge elicitation and *reflective practices*. The digital storytelling process helped the community to reach a higher level of awareness about their specific professional competencies and critical work issues, fostering high levels of commitment and motivation, transforming the community in a true Community of Practice.

Abstract in Italian

Le persone sembrano avere una abilità innata di rappresentare le loro esperienze attraverso una storia proprio perché esse facilitano la comunicazione rispetto a descrizioni puramente formali, veicolando emozionalità, un ricco contesto e una chiara descrizione di cause ed effetti. Questo studio esplorativo è basato su di un progetto formativo rivolto ad un gruppo di esperti di sicurezza alimentare (medici, veterinari, biologi, chimici, nutrizionisti e tecnici della prevenzione) della Regione Veneto. La formazione mirava a migliorare la cooperazione tra questi professionisti impegnati a gestire problemi di salute animale e di sicurezza alimentare e con scarse occasioni di scambiare informazioni durante le loro attività. A questo proposito è stata creata una Comunità di Pratica on-line: durante le attività è emerso come questi professionisti utilizzassero molto spesso modalità narrative per comunicare elementi di problem posing e problem solving. Per supportare questi processi, i partecipanti, suddivisi in gruppi, sono stati incoraggiati a realizzare dei Digital Storytelling sui temi problematici ritenuti più importanti ed in cui potevano raccontare le loro esperienze e le eventuali soluzioni. Il processo

di creazione e condivisione dei Digital ha avuto due effetti principali: da un lato ha migliorato la consapevolezza delle proprie specifiche competenze professionali e dall'altro ha stimolato la motivazione a partecipare alle attività della comunità trasformando conoscenza personale narrativa in una conoscenza inter-soggettiva e negoziata.

Keywords: Digital Storytelling, Community of Practice, reflective practices.

Introduction: Storytelling as rich form of communication and knowledge sharing

People seem to have an innate ability to represent their experiences in a natural way in the form of stories (Bruner, 1993; Ong, 2002) because they facilitate communication, describe content in a rich context and require less effort than more formal methods. Stories are the “means which human beings give meaning to their experience of temporality and personal actions” (Polkinghorne, 1988). We can tell a story for personal reasons, or to explain and teach a specific topic, so the term story can refer to either fiction or non fiction, depending on the context. In this paper we will use the term story to refer to the narration of a workplace real *case based* experience: this kind of stories are often used in professional contexts such as medical, law, and business because the story format provides an efficient way to deal with and communicate complex context in a short period of time.

In the last few years many authors have recognized the importance of storytelling as part of the adult learning process. Schank (1995) suggest that all we have are experiences, but all we can effectively tell others are stories and learning from one's own experiences depend upon being able to communicate our experiences as stories to others. Stories usually contain a detailed explanation of the cause-and-effect relationship between actions and their consequences. People prefer organized knowledge: personal narratives provide a built-in structure with clear predictable plots, with authentic contexts that are easily recognizable.

Other researchers have studied the role of stories in knowledge sharing in organizations (Orr, 1996; Prusak et al., 2012), in transmitting norms, values and to spark action (Denning, 2002), to promote strategic leadership (Boal & Schultz, 2007), to promote explicit tacit knowledge (Linde, 2001), to describe a problem and to suggest a possible solution (Jonassen & Hernandez-Serrano, 2002).

Digital Storytelling: a new tool for an old practice

Since early times stories have been transmitted through different ways: orally, textually or through art, nowadays it's possible to create personal narratives using new digital media, and share it on-line, so *Digital Storytelling* is not a totally new concept, but it is only a new genre or new way of transmitting the stories. Digital Storytelling was originally developed by the Center for Digital Storytelling in the early 1990's mainly to support personal narratives (Lambert, 2013), but it evolved to apply to a variety of purposes and is now broadly used in many contexts such as education (Robin, 2006) (Sadik, 2008; Ohler, 2013) social (Lambert, 2013), health promotion (Gubrium, Hill & Flicker, 2014), etc. A typical Digital Storytelling artifact is a video or a slide-show just a few minutes long and its essential elements include a strong point of view, dramatic questions and emotional content that keeps the viewer's attention and speaks directly to the audience: indeed, a digital story is often viewed as a strong emotional experience.

Digital stories also convey a more detailed context than textual and verbal stories, facilitating tacit knowledge elicitation (LeBlanc & Hogg, 2006; Whyte & Classen, 2012). The transformation of tacit knowledge into explicit knowledge is one of the most important processes inside an organization, so the better an organization is able to elicit tacit knowledge from its employees and share it inside, the more efficient it can be (Nonaka & Takeuchi, 1995).

Storytelling, problem solving and *War Stories*

Very often in professional contexts narrative knowledge, explicated in form of stories, offer a mean to distribute experiential knowledge and an important way to communicate ill-structured problems. In fact in many ethnographic studies researchers found that on difficult or not usual problems, professionals produce *good stories*: if they are really memorable and the problem has been solved in a particular new way, they became *war stories* and contribute to create a *community memory* (Orr, 1996). People with a good memory of war stories can become an important resource for the entire community.

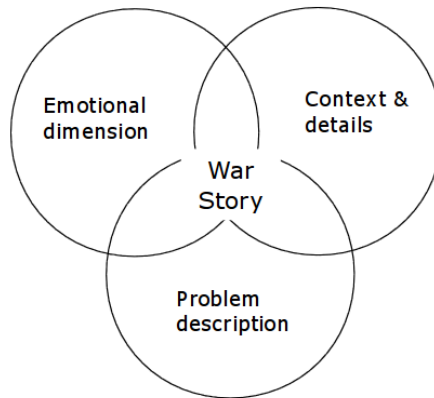


Figure 1. The main elements composing a war story: problem description without a rich context and without associating emotions, can't produce a good war story (Petrucco, 2013).

In a good *war story* you can find three important elements mixed together: the emotional and *dramatic* dimension, a rich description of a context, event or situation and the specification of solution (or failure) of a problem. Narrative seems to convey its message in an inherently human dimension that is lost in a formal schematic exposition (Jonassen & Hernandez-Serrano, 2002, p.66). So, a war story, from this point of view, is more than a simple report of facts, is an *entertaining* real knowledge-sharing process that facilitates the attainment of a vicarious experience (Bruner, 1990).

Storytelling to share professional practices

This exploratory study based on an ethnographic research (Ferranti, Nadin & Ravarotto, 2012), was carried out as a training project in 2012 and involved N = 72 food safety professionals (physicians, veterinarians, biologists, chemists, nutritionists and prevention technicians) of the Veneto regional health system (North Eastern Italy). The training project was aimed at improving the cooperation between people belonging to different service industries that deal with animal health and food safety. For these professionals, during their everyday work, there are few opportunities to exchange information and talk about and solve critical issues.

To fill this gap, we experimented with the creation of an on-line Community of Practice (Wenger, 2006). Initially the study was supposed to focus mainly on the analysis of relational processes and the thinking practices of a community of professionals that used for the first time the support of a platform and on-line forums, subsequently, the analysis of the interactions in the forums highlighted an interesting

factor concerning the manner in which the various problems for discussion were presented: in fact, they always began from a true story of a professional incident that the narrator was protagonist of or that in turn he had heard about from others. One of the participants wrote the following:

“In the forum ... you see what other colleagues think about a particular problem, in particular if they have resolved it. Some cases are still unresolved. But you can find out about a case that you yourself have solved the issue, maybe even 10 years ago, so you may have a suggestion for the individual who asks for help”

Very often the reaction of other colleagues, besides commenting on the story, was to discuss in turn a story from their own professional experience that either confirmed the same issue in other contexts, or provided a suitable solution in a similar context. In order to better shed light on the problems, pictures and photos taken by the same members of the community were also posted. Seeing thus the relevance that the emergence of narrative modalities in the processes of problem-sharing and problem-solving had taken on in the on-line community, we decided to support their *reflective practices* encouraging participants to create Digital Storytelling artifacts about the problems they perceived to be the most important.

It is recognized that experience by itself does not always lead to improved professional practices, unless we reflect on it: so communicating our experiences as stories is not enough, reflection is recognized as an important process needed for real change. Kolb's (1975) Learning Cycle, Schön's (1987) concept of the *reflective practitioner* and Gibbs (1988) Structured Debriefing, provided important theoretical references for this topic.

As Schön (1991) notes, we need to capture those stories to make them objects of reflection and with the help of multimedia, these stories can be recorded. One of the purposes of the study was then to determine how a collaborative digital storytelling construction process could support reflection on professional practices. To this aim, the following research questions were explored:

- How can a digital storytelling activity support reflective process to improve and diffuse good professional practices?

Our working hypothesis therefore provided for the use of Digital Storytelling in two successive stages: the first stage understood mainly as an internal process within the community, to encourage reflection on one's own professional practices told by the stories, and the second as a product to be utilized as a support for communicating best practices both inside and outside the community (Figure 2).

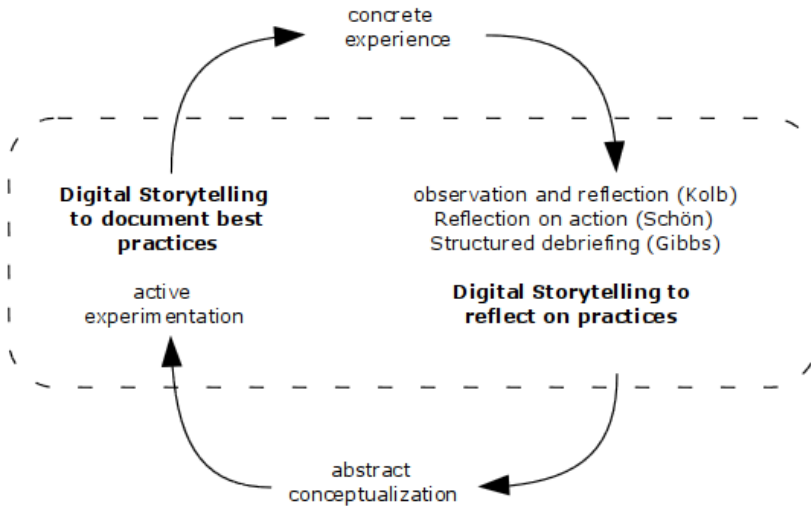


Figure 2. The implementation of a Digital Storytelling activity, inside a general model on reflective practice, based on the models of Kolb (1975), Schön (1978) and Gibbs (1988).

Creating a digital story as a reflective practice: the process

The stages of digital storytelling realizations

Prior to gathering in groups and telling their stories, we provided them with some *guidelines* in order to make them more aware of their role as storytellers and listeners, taking as a reference a number of conditions for encouraging participation in Mezirow's (1991) and (Tyler, 2009) *critical discourse*:

- The time spent for each story on storytelling and for possible requests for clarification and comments should not exceed 10 minutes;
- The story that was told had to have as a subject a non routine problem that required a creative or unusual solution or it had to be an issue that was not fully fixed by the protagonist;

- Everyone had to make themselves available to answer without reluctance questions for the purpose of making the issues clearer or expanding upon the issues rose by the others, and had to be as open as possible to accept comments, possible criticism and suggestions of potential alternative actions from the others, that could come out during the discussion.

This stage of storytelling and collective discussion of the stories was considered very important: in fact, in this manner one can negotiate shared meaning, and the listener also becomes a co-author of the narrative through a process of inter-subjective participation (Boje, 1991; Gabriel, 2000; Tsoukas, 2009). At the end, after hearing all the stories of their peers in each group, they chose to convert one into a Digital Story.

In order to facilitate the process of narration of the stories taken from the participants' professional experience and to save time, in our blended training program we decided to bring together all the participants on one day specifically dedicated to this activity. The participants worked in groups of 3-4 people telling each other stories taken from their work experience and then they chose which ones to discuss and elaborate.

This stage was very important because, from a cognitive point of view, they changed the story type: from a case-based story to a scenario-based/problem based story (Andrews, Hull & Donahue, 2009). In fact, analyzing each case-based story, they apply critical thinking setting up a typical scenario t problem hat can alter the original case to better suit the specific aim and improve the overall comprehension.

So, in a second step, they wrote the storyboards inside each group sparking discussions about what to change and what to leave, and at what level of details. After completing the storyboard they realize the videos themselves, because before, in the training course, participants had already learned to use some simple software video-editing tools.

The storyboard writing stage and the creation of the video

Even in this second stage participants were provided with some precise directions for drawing the storyboard in which the following elements about the plot had to be clearly defined: the main character(s) (who); the context (where) and the events timeline (when); the content (what happened, what was the problem, how and why did it happen). These elements are defined as *story grammars*, and they are tied together in a *plot*. Plot transforms a list of facts into a real narrative and creates meaning between separate story components (Ricoeur, 1984; Polkinghorne, 2004).

In addition to having a clear representation of the problem to narrate, we requested participants to pay particular attention to the broad description of the context, in that at times details are of fundamental importance in the solution of a problem and they help in making *tacit knowledge* explicit. The typical structure of a story in order to be recognized as well made, like the narratology of Propp, Greimas, Campbell and others, had to contain at least four elements:

1. the existence of a problem or something that needs to be done and gives meaning to the story,
2. a set of conceptual resources or materials that are necessary for the task,
3. a set of established rules to be respected, and finally
4. the recognition of the resolution of the story.

These constraints are useful as it seems that more linear structured guidelines to write digital stories more support reflection processes (Callens & Elen, 2011). For the purpose of stimulating critical reflection, we advised against choosing necessarily stories with a “happy ending”, and to also leave space for *cautionary tales* that in the context of work are often associated with “bad practices”.

The other important aspects that we required participants to pay a lot of attention to were:

- maintain in the story a balanced level of emotional involvement;
- selection of the most suitable audience for viewing the digital product;
- aim or intention (why that particular story was chosen, the underpinning morals and values);

With Digital Storytelling, the need to stimulate reflection must be balanced: an excessive degree of emotion that emerges from the story can seriously damage cognitive performance, particularly in the process of problem-solving. This criticism is clearly depicted by the Yerkes-Dodson law (Figure 3). Often it is through emotional connections, rather than reasoning, that a story is evaluated (Bowman et al., 2013).

The choice of the audience also implies a careful adjustment in the language, in the level of tacit knowledge to use in the drawing of the storyboard and in sharing the morals and the values that one wants to communicate. Telling a story to achieve a specific result is quite different from telling a story only for entertainment, so the way a story is performed is very important.

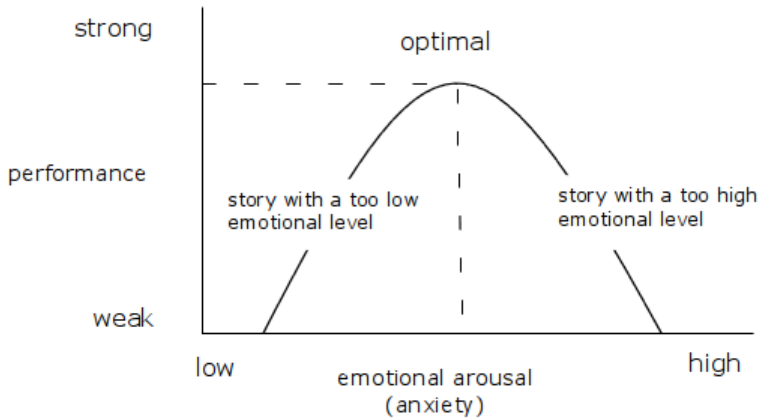


Figure 3. The Yerkes-Dodson law applied to the emotional content of a story (Broadhurst, 1957)

The reflective practices triggered

In order to stimulate reflective practices and to help to define the problematic moments of the stories, the groups were able to draw their *Visual Portrait of a Story* (Ohler, 2008): that is to think about the story more as a map of the critical moments and real *turning points*, rather than just a series of events presented in sequence. These moments, identified through a group discussion, were used as stimuli for reflection on the ways in which the problems were resolved, unresolved or resolved in an unsatisfactory manner by the protagonist or protagonists.

Topics of the digital storytelling

A total of 14 Digital Storytelling items were created on various topics of interest to the community of food safety professionals: for example. how to deal with cases of transporting a pet abroad, how to follow the proper procedures to ensure one cooks mushrooms collected personally without toxic risks, how to create samples that test for the presence of pesticide residues in agriculture, and the most effective methods for water inspection, etc. The participants identified four possible audiences for Digital Storytelling:

- their peers in the community,
- schools/students,
- institutions and food companies,
- consumers and citizens.

Of a total of 14 videos created, as many as 8 were addressed to a target audience of colleagues: this was considered a significant element, linked to the willingness to share experiences among members of the community about specific professional procedures which could be substantially different (for example procedures for water chemical control, in testing histamine in fish, in mushroom edibility, seafood sampling and so on). All videos were also classified according to the way they exposed the problem:

- most of them, 11, (79%) proposed a problem resolved in an effective manner,
- while 2 (14%) make explicit a problem solved but not in a completely satisfactory manner,
- only 1 (7%) showed a problem that has not been solved at all.

The preference for creating *problem solved* stories, was strongly related first to the will to help their peers and share effective solutions, and also to their need to compare with one another the quality of solutions adopted. In all cases, all types of videos were recognized by participants as valuable, real *shared artifacts* on which to discuss and refer to, inside and outside the on-line forums.

Digital stories to document best practices: between a willingness to share and privacy concerns

It's interesting to note that about half of the digital stories produced (58%) had targeted specific audiences, community members or outside co-workers. The intent of this approach was not only to provide immediate and concrete help to solving common problems, including that of wanting to keep the presentation of best practices in a coded and easily accessible form, different from other solely textual formal representations. Particular attention on the part of all participants was given to the problem of privacy: while sharing photos and pictures taken from real contexts within the closed forums of the community and used for the creation of digital stories did not raise any particular concerns, some problems emerged when we proposed to share some stories representing contexts and highly sensitive material, with a larger audience on specialized websites or simply on their corporate website. The solution proposed was not to give up the sharing, but as much as possible to rework the digital stories trying to eliminate any references considered sensitive.

Video creation

The actual creation stage of the video took place in part in person or in part it was carried out long distance, through the community forum, where participants continued to work on their digital story. The lack of experience with the use of

multimedia software on the part of some of the participants did not create particular difficulties because we originally provided for special training in their use in a series of laboratory meetings and we also had the help of more experienced colleagues. Interestingly, to confirm the fact that the images and videos used were actually derived from professional experiences, the majority of the material was obtained through the use of their mobile phones and not with professional video cameras or digital cameras.

Some preliminary findings

To gather feedback on their perceptions on the process of creating a Digital Storytelling artifact from their work experiences we submitted a simple questionnaire mainly to investigate:

- the possible use of the digital story in the workplace context
- the difficulty perceived in elaborating a story taken from a professional experience,
- the reflection on practices and competences stimulated by the digital story creation process

The participants' perception of the applicability of digital narratives in their workplace was very high (Figure 4): 49% said that it was highly applicable and 41% said it was applicable, for a total of 90%. They considered these digital narratives as shared knowledge artifacts, useful either in the workplace or in the on-line forums. In particular, the intentions of possible use are significant: most subjects think that digital storytelling is a good strategy for communicating content to the community (communicate with citizens, 25.4%) and this opinion is confirmed by the consideration that videos and images describe a situation better than words alone (20.1%).

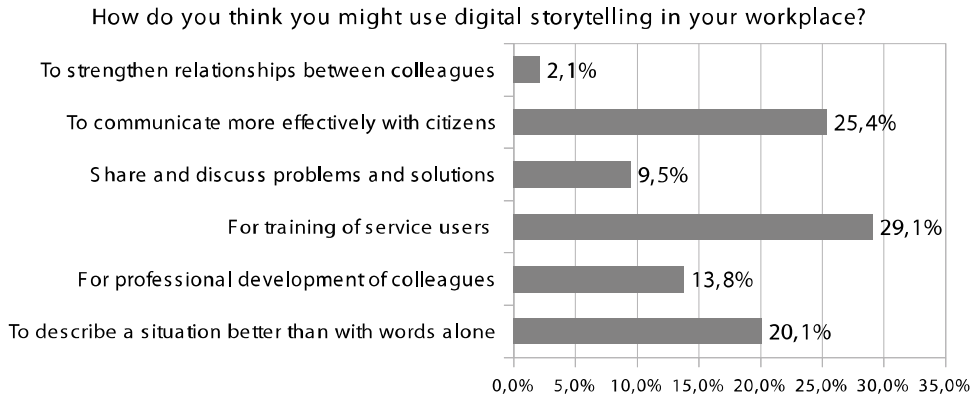


Figure 4. The perceived possible use of digital storytelling artifacts in workplace context

The answers to the question about the difficulty revealed a favourable bias: the average *complexity* of all the stories created was high, both with regard to the narrative aspect itself as well as the professional content. This was a sign that the process of recalling *good stories* taken from their workplace experience, writing a storyboard and translating it all into an audiovisual form, was a real deep reflective process. Most of the professionals (54%) did not seem to have particular trouble at this conceptual stage (Table 1) even though a total of 46% showed some problems in elaborating the story (14% difficult, 32% not too easy).

Table 5 The perceived difficulty in elaborating the stories from professional experience.

Question 1: How easy was it to elaborate stories taken from your professional experience?	
Very easy	7.30%
Easy	46.40%
Not too easy	31.90%
Difficult	46.40%

The many members said in personal interviews, that the difficulties encountered in the process of formalizing workplace experiences into digital narratives was mainly of two kinds: one, because they often had to elicit a lot of tacit knowledge *embedded* in their practices, and two, because they realized that, telling a story about a problem-solving incident, would have revealed necessarily to others a great deal about their professional competences on the subject.

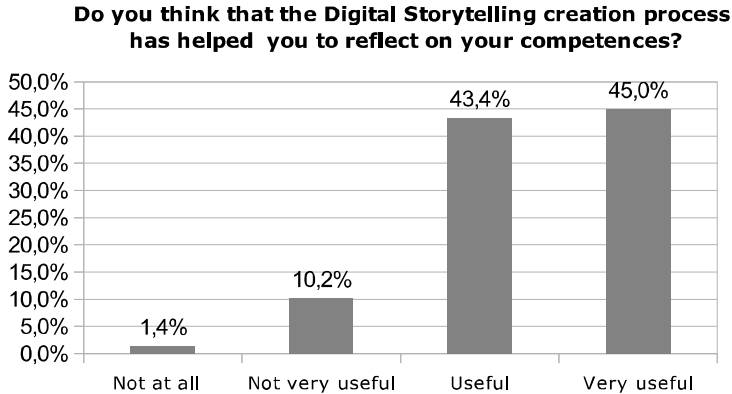


Figure 5. The perceived effect of the digital story creation process on reflective practices

Precisely this concern was taken into consideration by the question of how the process of creating a professional story and reworking the professional stories has made them reflect in depth on how to solve the problems proposed in the stories. Eighty-eight percent of participants said in this regard that the activity was perceived as very useful or useful and only 11% perceived it little or not at all useful (Figure 5).

Conclusions

The digital storytelling process helped the community to reach a higher level of awareness about their specific professional competencies and critical work issues, fostering high levels of commitment and motivation. This dialogic process can be a way to transform simple narrative knowledge into an inter-subjective, negotiated knowledge. In addition, digital storytelling became a real *transformative* tool for personal and professional development.

The apparent successful outcome of the narrative activity, creation and reflective processing of digital stories, encourages us to further test the method in this and other professional contexts, not only when it is necessary to stimulate *reflective practices*, but also when it is necessary to stimulate the emergence of a community of practice. In fact, during the collaborative creation of the digital story, the community can become a true community of practice because the Digital Storytelling realization process mediate relationships. When stories are shared, the trust and the relationships inside the community are strengthened.

In this respect then it becomes very important to mention the concept of *reification* of Wenger, this in fact implies that the production of concrete artifacts, and facilitating

the negotiation of meanings, is an important element upon which the community is based on, but unlike traditional storytelling activities which often take place orally, the realization of a concrete digital artifact offers numerous advantages. Not only during the initial step of creation, as we have seen, but it has alternative uses even later, when it can be made available to others, for example to support the training of new employees, or remain as documentation of best professional practices of the community or made available in new contexts, where it can be negotiated and re-interpreted and where it can generate important feedback for the community.

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Let's Look to Future! E-Learning-Trends and Hypes in Academic Teaching

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Abstract

The present paper introduces methodology and findings of a trend study in the field of online education. The overall interest of the study was the analysis of life stages and future potentials of e-learning innovations. A content analysis has been conducted based on 427 scientific articles of leading German-speaking e-learning conferences. Thus, e-learning trends and hypes in academic teaching have been identified and characterised. The following paper focuses on two things: on the one hand, existing academic concepts of trend research in the field of e-learning will be discussed, and on the other hand, the above-mentioned study will be introduced.

Abstract in German

Wie geht es mit E-Learning weiter? Welche E-Learning-Trends dominieren an Hochschulen? Der vorliegende Beitrag liefert ein differenziertes Bild über Trends und Hypes im E-Learning an Hochschulen. Basierend auf konzeptionellen Überlegungen und empirischen Befunden, resultierend aus der inhaltsanalytischen Auswertung von 427 Fachbeiträgen wissenschaftlicher E-Learning-Leitkonferenzen (GMW und DeLFI) werden Entwicklungstendenzen einzelner Anwendungen identifiziert und diskutiert.

Abstract in Polish

Niniejsza praca przedstawia metodologię i wyniki najnowszych badań naukowych w dziedzinie e-teachingu. Ogólnym przedmiotem zainteresowania badań była analiza etapów życia oraz potencjału przyszłościowego innowacji e-learningu. Zawartość analizy została przeprowadzona w oparciu o 427 artykułów naukowych powstałych w wyniku prowadzonych niemieckojęzycznych konferencji na temat e-learningu. W ten oto sposób trendy w dziedzinie e-learningu i rozgłos w szkolnictwie wyższym zostały zidentyfikowane oraz zcharakteryzowane. Niniejsza praca skupia się na dwóch aspektach: z jednej strony omówiona

zostanie obecność idei trendów naukowych w obszarze e-learningu w szkolnictwie wyższym, a z drugiej strony zostaną przedstawione wyżej wymienione badania.

Abstract in Hungarian

Jelen értekezés egy az e-oktatás területén végzett tendencia tanulmány módszertanát és eredményeit mutatja be. A tanulmány általános célja az életrészek és az e-learning jövőbeni innovációiban rejlő potenciálemelzése volt. A tartalom analízis német nyelvű e-learning konferenciák 427 tudományos cikke alapján került lefolytatásra. Így azonosításra és jellemzésre kerültek az akadémiai oktatás trendjei és hype-jai. A következő értekezés két dologra összpontosít: egyrészt tárgyalja az e-learning területét érintő akadémiai tendencia-elméleti megközelítéseket, másrészt a fent említett tanulmányt mutatja be.

Abstract in Spanish

El presente artículo introduce una metodología y resultados de un estudio sobre tendencias en el campo de enseñanza en línea (e-teaching). El propósito de dicho estudio era el análisis de etapas de vida y el potencial de innovaciones de enseñanza en línea. Se realizó un análisis de contenido de 427 artículos científicos, publicados en conferencias germanoparlantes destacadas sobre la enseñanza en línea. De esta forma, se identificaron tendencias y modas en la enseñanza académica. El presente artículo se enfoca en los siguientes dos temas: Por un lado, se discuten los conceptos académicos ya existentes sobre la investigación de tendencias en el campo de enseñanza en línea. Por el otro lado, se introduce el estudio arriba mencionado.

Keywords: e-learning, innovation, higher education, content analysis, future studies

Introduction

The integration of e-learning innovations is the current challenge for organisations in higher education in order to support learning, teaching, and administrative processes. Due to changed student needs, increased competition between organizations, different political and economic conditions, as well as new educational and technological approaches in higher education, institutions need to implement e-learning to generate additional educational and economic values (Seufert, 2008; Kleimann & Schmid, 2007). It should be noted that currently there is no common understanding of e-learning. Rather, the e-learning concept describes a variety of different forms of use of digital technologies in educational processes – from content distribution to online

testing (Fischer, 2013). The rapid technical progress and the continuous development of university didactics constantly leads to new formats of e-learning. In this paper, therefore, the term e-learning innovation is used for new technological and didactic forms of digital teaching. Thus, the definition of the term innovation bases mainly on Hauschildt (2004). E-learning innovations are new and not yet firmly anchored in institutional regulations or daily routines of academic staff (teachers or students). The long-term provision of e-learning innovations makes high demands on universities. On the one hand, teachers and students must be assisted in its use, besides technical conditions must be established to allow easy access and handling. Therefore, any e-learning innovation requires specific support services. The prospective design of the academic environment makes it therefore necessary to identify potential e-learning trends early on. The present contribution follows this approach. The following questions will be investigated. Which e-learning innovations dominate the current scientific discussions? Which approaches are close to a breakthrough? Which e-learning innovations have been or will be successful in higher education? Information about future challenges in the field of academic e-learning are needed to provide fitting conditions to teachers, like trainings, services, incentives or technologies.

In the following, studies and methods will be introduced in order to discuss future developments in the field of academic e-learning. In the next step, we will describe a theoretical approach to analyze and evaluate the life cycle of e-learning trends based on the degree of public discussions. Based on this, insights will be provided into a study which helped to identify and evaluate potential e-learning-trends in academic teaching in German institutions of higher education.

E-Learning innovations in Higher Education

In order to identify and characterise technical innovations which will have impacts on academic teaching, the Horizon Report will be introduced in the following chapter. The Horizon Report, which is published annually, identifies and characterises technological trends that are expected to have a great importance for the various levels of education in the following years¹, with a focus on academic teaching and learning. With the Horizon Report experts in education and technology research evaluate the short (<1 year), medium (2-3 years), and long-term (4-5 years) perspectives and effects of six technical innovations in the field of higher education (Bechmann, 2012).

¹ See in: <http://www.nmc.org/> [31 October 2015].

In the Horizon Report (2014), Flipped Classroom, Learning Analytics, 3D Printing, Games & Gamification, Quantified Self, and Virtual Assistants (see Table 1) were identified as trends in e-learning. However, a detailed review of the last Horizon Reports demonstrates the difficulties of forecasting. For example, in 2005 and 2006, as well as in 2011, 2012, and 2013, educational games were considered as a medium-term trend (two to three years). But for all that, the dissemination of game-based e-learning formats in academic teaching has not happened so far. As a short-term trend in 2009, 2010, 2011, and 2012, mobile applications (Mobile Apps) were considered. Also here the reality in institutions of higher education reveals another picture. However, other e-learning formats appear unexpectedly and diffuse rapidly in the field of academic teaching. A good example for this is Massive Open Online Courses (MOOCs). For the first time MOOCs were recorded in the Horizon Report in 2013 and immediately reached number one of all e-learning trends. In fact, many MOOCs exist in higher education and the number of publications and scientific events about them is growing rapidly (McAuley et al., 2013).

Table 6: Trends in e-learning based on the Horizon Reports (2008 to 2014)

Time to adopt	2014	2013	2012	2011	2010	2009	2008
< 1 year	Flipped Classroom Learning Analytics	MOOCs Tablet Computing	Mobile Apps Tablet Computing	Mobile Computing Electronic Books	Mobile Computing Open Content	Mobile Computing Cloud Computing	User-Generated Content Collaborations
2-3 years	3D Printing Games/ Gamification	Games/ Gamification Learning Analytics	Games/ Gamification Learning Analytics	Games/ Gamification Augmented Reality	Electronic Books Augmented Reality	Geo Everything Personal Web	Mobile Broadband Data Mashups
4-5 years	Quantified Self Virtual Assistant	3D Printing Wearable Technology	Gesture-based C. Internet of Things	Gesture-based C. Learning Analytics	Gesture-based C. Virtual Data Analysis	Semantic Applications Smart Objects	Collective Intelligence Social Operating S.

As the Horizon Report shows, the life cycle of e-learning innovations is not linear. Often new e-learning approaches appear suddenly on the agenda and dominate the scientific discussion at universities for a limited time. But they then disappear abruptly from the agenda as fast as they appeared. That is why forecasting is difficult. For the identification of trends and the assessment of future potentials, scientific instruments and methods are needed. One of these instruments is the Innovation Hype Cycle by the Gartner Group².

² See in: <http://www.gartner.com/technology/home.jsp> [31 October 2015].

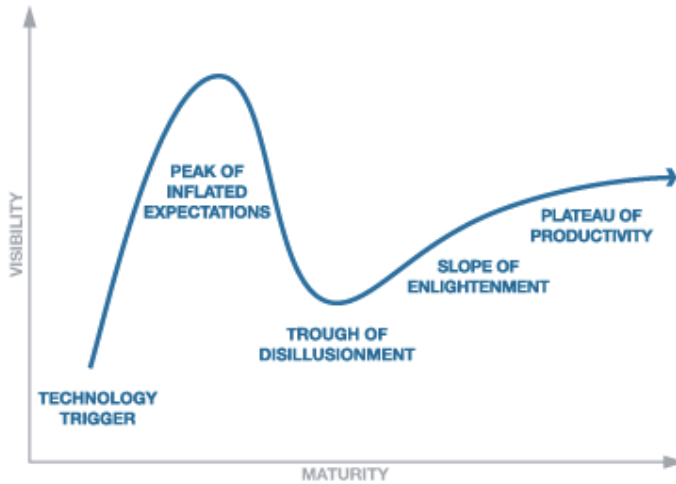


Figure 1. Gartner Hype Cycle (Gartner, 2014)

The Hype Cycle is an analytic instrument developed and used by the IT research and advisory firm Gartner to represent the maturity, adoption, and social application of emerging technologies (see Figure 1). The life cycle of technologies contains five phases. In the first phase (Technology Trigger), a technology breakthrough kicks off things. Based on early proof-of-concept stories, the interest of the public grows. In the second phase, early publicity produces a number of success stories. Growing public interest is then followed by the Peak of Inflated Expectations. In the next step (Trough of Disillusionment) public interest wanes because of failed experiments and implementations as well as the emergence of negative effects of the technology. The public interest grows again within the next phase. More examples of how organizations or users can benefit from the technology come to the fore, therefore the technology enters the Slope of Enlightenment. In the last phase, mainstream adoption starts and the Plateau of Productivity is reached. The technology's market applicability and relevance are clear and paying off. As the above description of the Innovation Hype Cycle shows, public attention or discussion is relevant for the evaluation of technology life stages.

Empirical study

Related to the general aim of this paper, an empirical study is now presented. The overall interest of the study was the analysis of life stages and future potentials of e-learning innovations. In order to make trends in e-learning in recent years at German universities visible, an investigation was carried out in 2014. The study should answer the following questions: Which e-learning formats dominate the current

scientific discussions? Which approaches are close to a breakthrough? Which innovations of e-learning have been or will be successful in academic teaching?

To answer these questions, a trend study based on a content analysis was performed (Langer, 2000). We assumed that the intensity of discussion about e-learning innovations is related to their life stage – within the innovation process – and the degree of usage in academic teaching. This idea is based on the Innovation Hype Cycle, which has been described above. Therefore we analyzed the topics of scientific contributions of leading German-speaking e-learning conferences and publications: Gesellschaft für Medien in der Wissenschaft (GMW)³ and E-Learning-Fachtagungen der Gesellschaft für Informatik e. V. (DeLFI)⁴. 427 scientific papers of both conferences resulted in the period from 2007 to 2013. Both conferences address scientists of German universities which apply e-learning in academic teaching. While the GMW has a strong focus on didactic innovations, e-learning applications tend to be discussed more from a technical perspective at the DeLFI. In combination both conferences demonstrate the technical and didactical potentials of e-learning innovations.

The trend study is based methodically on the approach of qualitative content analysis (Mayring, 2008). First of all, the topics of the articles were identified and then combined into categories. In this way a system of categories was derived inductively which covers the main topics of both conferences. All conference contributions of the GMW (n = 234) and DeLFI (n = 193) were sorted into the category system. For practical reasons, only the abstracts of the respective contributions (n = 427) were used. The following categories of e-learning innovations were distinguished within the study: Social Software (systems or applications to support communication and cooperation), E-Assessment (handling online exams and test scenarios), E-Portfolio (systems for collecting and evaluation of digital artifacts), Mobile Learning (mobile applications for academic learning), Audio/Video (podcasts or videos in academic teaching), Virtual Worlds (artificial, virtual environments; e.g. Second Life), Learning Management Systems (central systems for providing and managing e-learning scenarios), Virtual Classroom (systems for synchronous cooperation), Open Content (systems for the provision of open learning resources, e.g. OER), and MOOCs (Massive Open Online Courses).

³ See in: <http://www.gmw-online.de> [31 October 2015].

⁴ See in: <http://fg-elearning.gi.de/fachgruppe-e-learning/delfi-tagung> [31 October 2015].

The basic assumption of the study was that conclusions about the development potential of e-learning innovations in the German Higher Education can be drawn from the analysis of the scientific contributions within the two selected e-learning conferences. As the Innovation Hype Cycle suggests, the degree of discussion delivers hints of the life stage of innovation. On that basis, it is assumed that frequently discussed innovations in these scientific conferences should have a high potential for academic teaching.

Findings

The findings of the investigation are presented below. Table 2 shows how many papers of GMW and DeLFI conferences report about the respective e-learning innovations. The following assumptions can be derived from the results:

- The cumulative frequencies (last column) dictate which innovations dominated and shaped the scientific discussion during the investigation period (from 2007 to 2013).
- The detailed analysis of the frequency distribution over the seven years shows trends in the investigation period. The increase of frequency goes along with an increase of importance for academic teaching.
- From the distribution of the frequencies within the two conferences, conclusions about the didactical or technical potentials of innovations can be drawn because both conferences are different in terms of their objectives. The GMW is more oriented towards didactical issues, whereas the DeLFI targets increasingly technical topics.

Table 7: Findings of the study (number of articles concerning the innovation per year)

GMW (n=234) DeLFI (n=193)	2007	2008	2009	2010	2011	2012	2013	Total
Learning Management	9	9	3	14	6	5	10	56
Social Software	10	10	8	6	7	5	9	55
E-Assessment	8	7	3	8	8	8	4	46
Audio/ Video	3	4	6	1	5	2	6	27
Virtual Classroom	4	3	3	3	3	7	6	29
E-Portfolio	3	3	6	5	5	3	7	32
Open Content	5	2	4	2	3	6	3	25
Mobile Learning	2	3	5	5	2	3	1	21
MOOCs	4	2	2	1	0	2	2	13
	0	5	1	2	1	4	2	15
	3	3	0	3	1	6	4	20
	0	1	0	0	0	0	0	1
	3	1	0	0	6	3	0	13
	1	0	0	1	2	0	1	5
	0	0	0	0	0	4	8	12
	1	0	1	0	2	4	4	12
	0	0	0	0	0	0	6	5
	0	0	0	0	0	0	2	2

In the following, the interpretation of the findings will be presented. To achieve the prognostic targets of a trend study, striking findings of the study will be formulated in the form of theses.

LMS – part of our routines!

Learning management systems (LMS) are the backbone of e-learning in higher education. Numerous articles about LMSs have been presented continuously at both conferences. The decreasing scope of the scientific discussion should not be interpreted as a loss of importance, but rather for the productive usage of LMSs in daily routines of academic teaching. LMSs are an essential part of academic teaching.

Social Software – didactical potentials for academic teaching!

Considering the discussion about Social Software, it is striking that it is addressed much more often within the didactic-pedagogical-oriented GMW – in quantitative terms – (46) than within the DeLFI (27), since the DeLFI has a stronger focus on technical topics. It can be concluded that Social Software – and the associated learning activities like communication, co-operation, and prosumption – is currently considered primarily as a didactic innovation.

Downfall of virtual worlds!

In 2007, virtual worlds were identified as a medium-term e-learning trend in the Horizon Report, with an expected breakthrough time of 2-3 years. The euphoria was triggered by the public interest related to the application *Second Life*. But for all that, the scientific discussion of virtual worlds decreases continuously. This is confirmed by current Google statistics (Google trends), which capture and analyze general trends related to internet search queries (see Figure 2). Virtual learning environments could not prevail at universities and will probably disappear from the e-learning agenda in the medium-term.

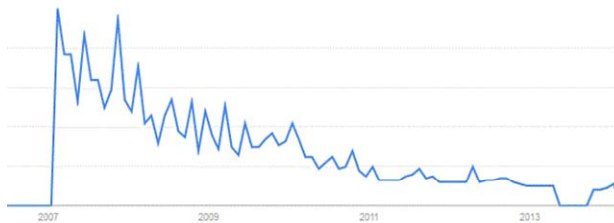


Figure 2. Search queries in Google, analysed by www.google.de/trends
(Keyword: *Virtuelle Welten*⁵)

E-Portfolio – a didactic innovation close to a breakthrough!

E-portfolios have become established firmly in the academic discourse about e-learning. However, it is more surprising, therefore, that e-portfolios have not been included in the internationally oriented Horizon Report. It cannot be determined whether e-portfolios are merely a phenomenon in the German-speaking area of Higher Education or not. In any case, the investigation showed that e-portfolios were significantly more in focus at the GMW conferences (20). Therefore they are probably more a didactical and organizational innovation in academic teaching than a technical challenge.

The long way of Mobile Learning!

From 2009 to 2012, mobile applications were number one of all e-learning trends in the Horizon Report. But what about the professional debate in the German higher education area? So far, mobile trends in e-learning have been rarely discussed at the investigated conferences. Until 2010 there were only two articles about this topic (in both conferences). However, mobile learning has moved into the focus of the GMW

⁵ German translation of “virtual worlds”

and the DeLFI during the past three years (12 papers in 2013) and now it seems to be established in the scientific discourse within German-speaking universities.

What about MOOCs?

MOOCs have unexpectedly become number one among all e-learning trends in the Horizon Report 2013. Throughout the period since 2007, there had been no indications suggesting this development. Neither the acronym MOOC nor the ideas behind it (open online teaching for large groups of learners) were identified as trends in the Horizon Reports. In 2013, the first articles about MOOCs were published in the GMW (6) and Delphi (2) proceedings. The fact that MOOCs belong to the e-learning trends with the largest development potential in academic teaching is shown by the practices of many universities. Numerous MOOCs have been developed in the past few months⁶ and the public debate about MOOCs is growing (see Figure 3). However, it is too early to assess the true potential of MOOCs.



Figure 3. Internet search queries in Google, analysed by www.google.de/trends (Keyword: MOOCs)

Limitations

The presented findings are the result of an exploratory study. With this in mind, the described research design can lead to distortions or errors, which can have impacts on the validity of the findings.

- Only abstracts of the contributions have been investigated. It is conceivable that in the complete articles topics have been addressed which are not referenced to in the abstract or that abstracts are enriched by modern (trend) terms to attract the attention of potential readers. In both cases, the

⁶ The European Knowledge Centre for Open Education currently listed 1771 MOOCs of European universities (http://openeducationeuropa.eu/de/european_scoreboard_moocs) on 31 October 2015.

assignment of the content into the categories has been incomplete or incorrect.

- For many e-learning innovations, there are no fixed technical terms in the scientific debate. The assignment of concepts to pre-defined categories is therefore difficult. Errors in the category allocation due to unclear terminology cannot be excluded.
- We analysed the frequency of reports concerning e-learning innovations. The correlation between the frequency of reporting and the future potential of innovative e-learning applications has not been established empirically, but follows plausibility considerations (Rogers, 2003; Gartner, 2014).
- Organisers of the investigated conferences often define the (main) topics. This influenced the spectrum of represented topics over all, as well as the focus of individual contributions.
- The above-presented study was conducted at German-speaking conferences and therefore reflects the situation in Germany, Switzerland, and Austria. The structure and culture of Higher Education in all three countries is comparable. As the usage of digital media highly correlates with national characteristics of the higher educational system, the findings cannot be generalised. The situation of e-teaching might be very different in English or French-speaking areas.

Résumé

These above-mentioned limitations could affect the scientific quality of the results. The data and findings therefore should not be over-interpreted. Despite all the potential limitations, the data provide on the one hand a differentiated picture of the current debate focus of e-learning innovations in higher education. Some trends have become visible. On the other hand, the study describes a methodical approach to characterizing the life cycle of innovations by analyzing scientific material.

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Online or Blended – Comparing Online and Blended Courses

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Abstract

As broadband internet access and LMS technology are rapidly expanding, and ICT is becoming a part of the teacher education curriculum, online learning is growing in all parts of the world in order to open education to everyone. Online collaborative work can bring specialists to every class, connect between students in different countries and from different cultures and adapt learning to the flat world. This research compares blended and online models of teaching in two versions of the same course at a teacher college in Israel. Each learning activity in class in the blended model has become an online activity in the online course. What is the contribution of an online course to students as compared with the contribution of a blended version of the same course? An achievement test, questionnaires, course products, interviews and statistic tools assisted to measure, investigate and estimate the contribution of each model to the development of students' skills, and the advantages and disadvantages of each model. Results indicated that an online course, which uses state-of-the-art ICT and major pedagogical considerations in organizing its online learning activities, has the potential to create meaningful learning.

Abstract in Hebrew

ההוראה המקוונת הפכה לחלק אינטגרלי בהשכלה הגבוהה ובאוניברסיטאות (שמנגישים את MOOCs המתקדמות נפתחים קורסים רבי משתתפים) הלמידה לקהל הרחב. ההוראה המקוונת הפכה לחלק מהכשרת המורים לבית הספר העתידי. לכן, חשוב להבין את תרומת הקורסים מקוונים למתכשרים להוראה. ההוראה המקוונת נבחנה במופעים שונים שלה מבחינת מספר המפגשים ודרכי ההוראה. נערכה השוואה בין דגם הוראה מעורב לדגם של הוראה מקוונת מלאה בשתי גרסאות של קורס דומה (Blended) במכללת סמינר הקיבוצים. כל פעילות למידה בכיתה במודל המעורב הפכה לפעילות מקוונת בקורס המקוון תוך השוואה בין השתיים ובחינת תרומתו של קורס מקוון לסטודנטים בהשוואה לתרומת גרסה מעורבת של אותו קורס. המחקר התבסס על מבחן הישגים, שאלונים, בחינת תוצרי הקורס, וראיונות עם סטודנטים. נמצא כי הסטודנטים העריכו את שני הקורסים במידה רבה אך ההערכה הייתה גבוהה יותר בקורס המקוון. הם גם העריכו יותר את ארגון

Introduction

As broadband Internet access and LMS (Learning Management Systems) technology are rapidly expanding, and ICT (Information and Communication Technologies) are becoming a part of the teacher education curriculum, online learning is growing in all parts of the world in order to open education to everyone. National programs are provided in the US and Europe (OECD, 2011) as well as in Israel. The rationale is that integrating ICT into teaching and learning will prepare the students to the changing world (Resta & Carroll, 2010; UNESCO, 2009). Those programs promote the integration of technologies in schools and the training of teachers to integrate ICT in teaching, preparing them to the 21st century. Teachers are required to adapt teaching to the changing world in relation to the pedagogical and technological aspects (Goldstein, Waldman, Tesler & Shonfeld et al., 2012). As part of preparing teacher-students to 21st century skills, online courses are becoming part of the curriculums. This research examined an online course in a teacher education college in Israel and its contribution to the students, as compared with its blended course equivalent.

Literature review

Transition from the traditional teaching to novel teaching methods requires deep learning in order to develop new knowledge. Mishra and Koehler (2006) defined it as an intersection of content, pedagogical and technological knowledge (the TPaCK model), meaning that educators should acquire not only technological skills but, more important, they need to be familiarized with or invent new teaching methods to implement teaching technologies in their specific subject matters.

The Israel Ministry of Education has been implementing computerized learning in schools since the early 1990s as part of the *Science and Technology* Curriculum. Schools received computers, and new books with learning software were produced. However, the OECD report on PISA scores has previously placed Israeli students under the average score in most ICT skills tests (OECD, 2011). In response to the relatively poor achievement of the students in national scores, the Ministry of

Education launched a new program in the 2010-2011 school years to adapt the education system to the 21st century through the use of innovative pedagogy that integrates ICT. This ongoing program aims to equip pupils with the relevant skills for optimum functioning in the 21st century (*21st century skills*). Teaching is adapted to suit the diversity of the students, to break down barriers between the school and the outside world, and to make maximum yet enlightened use of technology to promote the teaching processes at the pedagogical and management levels (Israeli MOE, 2011). This initiative focuses on preparing tomorrow teachers to develop pedagogical innovations and teaching skills and empower them to lead school staff in the future in effective ICT integration in education (Israeli MOE, 2011; Melamed et al., 2010). In addition, student-teachers are required to be trained in online learning because of the need to online teaching in the education system (NACOL, 2007).

Teacher colleges that are preparing teachers for the 21st century should develop pedagogical perceptions, 21st century skills and ICT oriented teaching methods. Teachers who are modelling online teaching and providing learning experiences could influence students' perceptions and attitudes (Cochran-Smith, 2003). Practice in online environments could lead teachers to include pedagogies based on those environments. This is important because of the natural environment in which children are living in today and the image of schools as non-relevant for future life. Nevertheless, online learning is not enough to make the real change in school but it might lead schools to be more relevant for pupils' life (Rotem & Peled, 2008). Using online collaborative work could bring specialists to every class, connect between students in different countries and from different cultures (Shonfeld, Hoter & Ganayem, 2013; Resta & Shonfeld, 2013) and adapt learning to the flat world.

Bonk (2009) describes the availability of education from anywhere at any time with computers and Internet access. New technology-based teaching methods and processes have been developed and incorporated in active learning processes. Researchers agree that students taking online courses are required to possess self-learning abilities, maturity and high self-discipline, high motivation, the capability of expression and communication in writing, time organization skills, as well as the ability to manage an online learning environment (Trentin, 2002). Furthermore, Cavanaugh et al. (2008) review of the literature pointed to greater improvement in critical thinking, researching, use of computers, independent learning, problem solving, creative thinking, decision-making, and time management skills of online students compared to their counterparts in traditional classroom settings. Unsurprisingly, the online learning environment poses some challenges to student

learning as well as numerous benefits. The information revolution effected significant change in life. Broad accessibility increase the use of online learning in various education systems. Online learning is not limited in time and place, enables flexibility and personalization in learning. Nevertheless, it is not easy to integrate it in school and prepare teachers to use ICT in their teaching (Even & Selvi, 2010).

In the past, distance learning used to be through mail, radio and television where all learning activities were asynchronous. Therefore, online learning seems to be asynchronous taking place in LMS systems such as MOODLE. Those serve as a space for managing the materials, the activities and the communication between the teacher and the students asynchronously (Moore & Kearsley, 2012). However, the latest technologies, accessibility to Internet and the wide broadband promote synchronous learning, integrating text, audio and video in online environments such as Skype, Elluminate or Hangout (Roseth, Akcaoglu & Zellner, 2013).

Integration of the different environments enables to suit technology, pedagogy and content to students needs and to the requirements of the teaching and learning settings (Mishra & Koehler, 2006). However, at the design level of the online course it is important to get the right decisions about the structure of the course relating to the desired pedagogy. For example online collaborative pedagogy requires the use of WEB2 tools and etc.

Research done in the last 20 years show no significant difference in achievement tests comparing students grades in online courses and traditional courses. Nevertheless, it is important to distinguish between success of different learners in different teaching methods and in the different styles of teaching and learning. More research is needed to understand the efficacy of online environment to different students (Moore & Kearsley, 2012). Thus, research on online courses and blended courses could contribute to the knowledge of designing online courses, building it and integrating it in the educational system.

Study context and subjects

This study compares two models of teaching in two versions of the course “Teaching and Learning in Computerized Environments” in a college of education in Israel. Two groups of undergraduate students participated in the study. They randomly registered to one of the courses according to their study program. In one course (N = 18), the model of teaching was online with only one face-to-face meeting, while the rest was online (20 assignments). In the second course (N = 18), the model of teaching was

Research questions and hypothesis

What is the contribution of the online course to education students versus the blended course?

Sub-questions:

1. What is the contribution of each model to the training of students to integrate ICT in teaching, as students and as teachers of the future?
2. What is the contribution of each model to the student's perception about the integration of ICT in teaching?
3. What is the contribution of each model to the achievements of the student?

The research hypothesis is that the online and blended models of teaching will have a different effect on the students regarding their achievements, attitudes, self-efficacy enhancement and overall learning experience. Therefore, it is interesting to compare the different models of teaching within the same population of students.

Study type

This is a mixed-methods study. The research question was investigated using quantitative methods including questionnaires with closed and open questions and an achievement test. However, various qualitative research methods were also included to help understanding the differences between the students' learning models: interviews were conducted with five students from each course (each model). Preliminary findings helped to develop the interviews questionnaire. There was also a qualitative analysis of the products in the courses in order to estimate the contribution of each model to the development of students' skills, and the advantages and disadvantages of

each model. Rights of the participants were ensured by anonymous questionnaires and interview data saving names. The data was collected at the end of the course and did not affect the assessment of students.

Procedure

During the course, at the end of each of the five study units, there were two reflection assignments: reflections of what the students thought was the most important thing they learned in that unit, and reflections of their thoughts and feelings toward the course. At the end of the course, the students took the exam and filled two questionnaires: One was an adaptation of the MOFET research network questionnaire (Goldshtein et al, 2012). The other was the standard feedback questionnaire that Kibbutzim College randomly distributes at the end of courses, relating all aspects of the course and the lecturer. In addition, there were interviews with five students from each course.

Results

Six variables were defined in the questionnaire and were checked for variability: Teaching process, Contribution of the course to teaching and learning, Contribution of online tools, Self-learning, Satisfaction, Accomplishing learning tasks and Use of technology for teaching and learning. The reliability (Cronbach's Alpha) of the different items in each category in the questionnaire was very high, as presented in Table 1.

Table 1: The reliability of the different items in each category of the questionnaire

The Questionnaire category	Number of items in category	Cronbach's Alpha
Teaching process	11	0.84
Contribution of the course to teaching and learning	5	0.82
Contribution of online tools	9	0.69
Self-learning	15	0.90
Satisfaction	8	0.77
Accomplishing learning tasks	10	0.72
Use of technology for teaching and learning	6	0.75

The college feedback questionnaire showed that the students appreciated both courses and the scores were high in the two models of teaching. In the blended course the overall score was 9.20 (10 was the Max) while in the online course the overall score was a little bit higher, 9.34. In the category of student's contribution to the course, the score of the blended course (9.04) was higher than the score of the online course (8.42)

while in relation to their peers' contribution the online score (9.26) was higher than the blended course scores (8.82). The online course students ranked the course organization higher (9.30) as compared to the score in the blended course (9.04).

Analysing the course products and activities showed no differences in activities pattern in individual assignments, while in the collaborative assignments, especially those requiring discussion, there were differences. Only few students participated in class discussions, while in the online course most of the students participated.

Students from the blended course emphasized the ICT tools they learned to use while students from the online course emphasized self-learning, peer teaching and various pedagogical strategies. As one of them wrote: "It enabled me to take responsibility on learning, to get involved in learning and to put efforts in learning".

Comparing the results of the seven variables (Table 1) shows differences between the two groups. They were not significant, yet they were consistent. The online students scored higher in important parameters: (a) Contribution to learning including the knowledge to choose technology and use it in class for teaching and learning, and the ability to guide other teachers in integrating ICT in teaching. (b) Satisfaction from the methodology and communication in the course. (c) The overall process in the course including the online environment, the teaching method and the assignments in the course. Figure 1 presents the results:

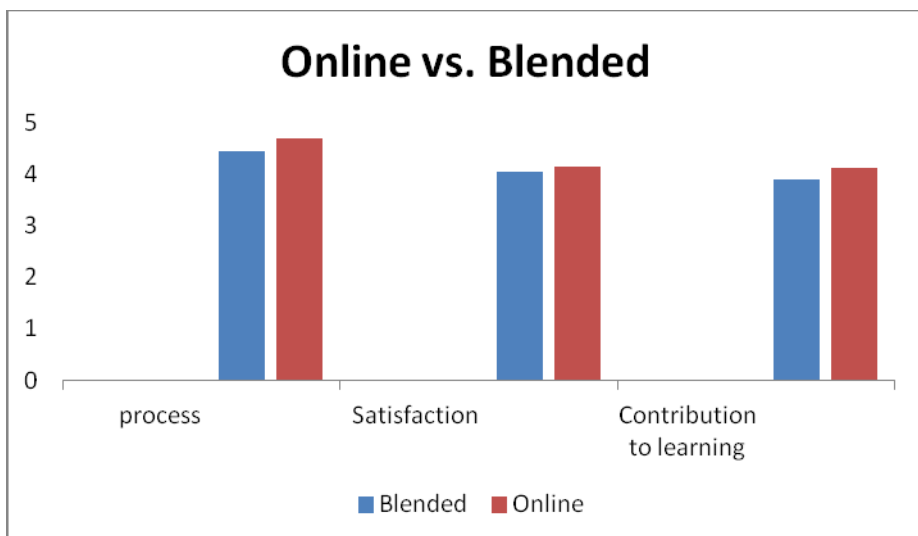


Figure 1. Differences in the scores of online and blended learners in evaluating the course

The open questions showed differences as well. Students from the online course emphasized the new ways to teach and learn. X. From the online course claimed: “The course open my mind to more ways to reach students”. Y. from the online course emphasized the self-learning skills and related them to his teaching experience: “I think the course helped me by letting me experience self- learning in a way that I would like my students to experience too”. V. continued to explain the relevance to his teaching by saying: “I think I got tools that will help me adjust my teaching to the students’ different learning styles”.

Students from the blended course emphasized ICT and online tools: A. related to the tools and said: “I was contributed by practical tools”. B. claimed that he changed his mind about e-learning as part of teaching but emphasized the tools as well: “The course has contributed to my understanding that E-learning can and should be incorporated in teaching, and exposed me to online tools for such teaching”. C. explained to relevant to teaching but related as well to the different tools he would use, as he wrote: “The use of computers (and smartphones) and whatever they offer have helped me and will help me teach in a more suitable way for youth, a way that will make them more involved in the process”. It seems that tools attracted the students in the blended course more while the online students put more emphasize on the methodology of learning.

Discussion

Differences in students’ feedback to the course revealed the capability of online courses to demonstrate various methods of organizing course materials. There were differences in students’ perceptions of their contribution to the course. The online students ranked higher the contribution of peer teaching to the course. Peer teaching is one of the recommended methods in training students and teachers in order to expose them to the 21st century skills. Peer review and peer teaching is the second step for collaborative learning (Salmons, 2011). However, it was surprising to find that online course students ranked lower their contribution to the course than the blended course students although the students of the online course dealt with more assignments and worked as self-learners. This is in spite of the assumption that students taking online course can appreciate their self-learning abilities (Leasure, Davis, & Thievon, 2000).

Online courses can use unique online tools that have the potential to change pedagogy as was found while comparing each class learning activity to its online equivalent. In class discussions, only few students participated, and all could hear each answer and relate to it, thus students that did not read the discussed article participated in the discussion. Online QA forums (require submitting an answer in order to see and to participate in the discussion) guided each student to post an original answer without seeing any other answers. Only after publishing the post, the student could read others posts and reply some of them. This is possible only in online discussion and cannot happen in class discussion. After all students phrase their thoughts in a relatively short original answer, they compare it to the other opinions and study other points of view and ideas in the forum. This is where meaningful learning can begin. This pedagogical strategy was also achieved by using personal blogs, and after the students posted all personal posts, the blog was switched into common (collaborative) blog, which enable peer-to-peer comments and replies. In this research, the online discussions were wider, richer and more contributing according to students' opinions (and the researchers' indications) than class discussions. This is in light of the literature that describes online learning as catalysis for creative learning and critical thinking (Cavanaugh et al., 2008). The use of different tools might result in pedagogical biases and those can be found in technologies such as online discussion platforms and other tools (Scardamalia & Bereiter, 2008).

The differences between the two groups were not significant, yet they were consistent. The online students scored higher in all important parameters. It seems that the differences between the groups were not significant for two reasons: one – the groups were small (N = 18 each). The other – both groups had similar educational perceptions. This suggests further research with larger and more heterogeneous groups.

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Badging and Employability at the Open University

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Abstract

Awarding badges to recognise achievement is nothing new. Of late, badging has gone digital, offering new ways to recognise learning and motivate learners, providing evidence of skills and achievements both within and beyond formal learning contexts. Badging (or *soft accreditation*) has been piloted in various forms by the Open University (OU) in 2013, both in discrete projects and elsewhere on open courses and employer-led initiatives. This paper outlines what the OU has learned from its pilot projects and details how the University is subsequently developing a suite of badges for informal and formal students that align with employability and the OU's existing skills-related open educational resources (OER).

The OU's badging pilots are informed by recent research (Perryman, Law & Law, 2013; Law, Perryman & Law, 2013) into the motivations and demographic profile of learners using the free educational resources which the OU makes available through its OpenLearn and iTunes U platforms. The research findings had indicated that a substantial number of informal learners using the OU's free content do so for work and/or professional development and that learners are eager to have their informal learning achievements recognised in some way. The research also provided evidence that OpenLearn is providing a bridge to formal learning in several different respects, suggesting that the addition of badging could strengthen this bridge.

The evaluation of the 2013 pilots indicated that learners who achieved badges were highly motivated by the experience and that the badged courses attracted learners who were particularly inclined to become students. The evaluation has subsequently informed the development of a further project to deliver a suite of free, open courses of 24-hours learning, each of which are assessed through the deployment of a set of Moodle quizzes. To mitigate perceived risks to the sector and the University of providing a badged OU curriculum on a bite-sized scale,

badges are limited to employability and skills development. The badged courses will be provided free of charge to the learner and those achieving badges will be encouraged to display them through their public-facing profile on the OpenLearn website. The badged content will be evaluated for its efficacy to motivate and develop informal learners and to provide employability skills for OU students. It is hoped that this paper will stimulate academic interest in the topic and will be of interest to Higher Education Institutions (HEIs) globally and open up the discussion around developing a known currency of non-accredited learning.

Keywords: Open educational resources, open educational practices, MOOCs, OpenLearn, informal learning

Introduction

Awarding badges to recognise achievement is nothing new. In the UK and internationally, Brownies, Guides and Scouts have long used badges to drive and acknowledge the skills development of young people, who collect fabric badges to sew on their uniforms. Of late, badging has spread to the world of adults and, as with many things, has gone digital. Digital badges offer new ways to recognise learning, providing evidence of skills and achievements both within and beyond formal learning contexts. As such, they can work both in motivating formal and informal learners, and in attracting new students to paid-for study. Mozilla's Carla Casilli and Erin Knight (2012) describe digital badges as "Digital tokens that appear as icons or logos on a web page or other online venue which are awarded by institutions, organizations, groups, or individuals, to signify accomplishments..." Hickey (2012) identifies three possible functions for digital badges:

1. *Summative functions*, which are often called *assessment OF learning*.
2. *Formative functions* for individuals, which are often called *assessment FOR learning*.
3. *Transformative functions* for systems, which a few are calling *assessment AS learning*.

The concept of badging (or *soft accreditation*) has been piloted in various forms by the OU in 2013. In support of the OU priority Journeys from Informal to Formal Learning (JIFL), recognition of informal learners' achievements on the OU's OpenLearn platform currently takes the form of a user profile and a *Statement of Activity*, detailing course excerpts that have been viewed online. To enhance learner confidence and progression badges, as a visual representation of achievement or participation, have

been investigated and piloted in discrete projects at the OU and elsewhere on open courses and employer-led initiatives. As badges for free learning represent a challenge to the education sector overall, the OU's next steps beyond these first pilots must acknowledge the risk of this disruptive innovation, through a focused lens of activity.

The Mozilla Foundation, who has so far led the digital badge initiative in terms of technical infrastructure, invite learners to obtain a badge from various (mainly US) providers <https://wiki.mozilla.org/Badges/Issuers>. Organisations that issue badges come from a range of sectors including formal and informal educational institutions, multinational corporations, industry associations, non-profits and groups interested in professional development. Each badge displayed should link to a page that shows what the learner did to obtain the badge.

Background: free learning from the Open University

The OU makes its free educational resources available on various third party platforms (such as iTunes U, YouTube, Google Play and AudioBoom) and via its web-based free educational resources platform, OpenLearn (www.open.edu/openlearn). OpenLearn was launched in 2006 and hosts hundreds of online courses and videos, many of which are openly licensed, and is accessed by over 5 million users a year. It also serves as the medium through which the OU promotes its partnership with the BBC and the related broadcasting and free open access courses and content that is created as co-productions with them. Since its launch, OpenLearn has received 40 million unique visitors (internal OU data) and has developed from being a platform that hosts units from decommissioned undergraduate and postgraduate courses, to one which hosts commissioned interactive games, videos, blogs, podcasts and which offers users the opportunity to order free printed materials. Much of the course extract content is developed using structured authoring tools which is made available to users in multiple formats such as Microsoft Word and epub (that can be opened by ebook readers).

The development of OpenLearn was initially funded by the William and Flora Hewlett Foundation in 2006. With the end of the grant, OpenLearn became mainstream activities for the OU and now form part of JIFL priority as part of the OU's commitment to widening participation. The OU aims that 5% of each of its courses should be made available as OpenLearn content and for the period August to December 2013, the OU reports a 12.9% click-through from OpenLearn to the *Study at the OU* webpage to learn more about becoming an OU student.

The Open University's informal learners

In 2013, the Open University's OER Research Hub and Open Media Unit collaborated in a large scale study profiling the demographics and motivations of its informal learners i.e. people using the OU's OpenLearn and iTunes U platforms (see Law et al., 2013). This study has informed the development of the OU's badging provision, which is designed to serve the needs of the University's informal learners, especially those who are learning for employment-related reasons. The 2013 study informed the OU's badging pilot projects in three ways:

- By providing evidence about informal learners' motivations for using OpenLearn and iTunes U content;
- By leading to a greater understanding of the typical users of the two platforms (e.g. their age, qualifications, employment status and location);
- By giving a nuanced picture of the ways in which the OU's free educational content is providing a bridge between informal and formal learning.

Table 1 shows the balance between informal and formal learners, and educators in the OpenLearn and iTunes U survey sample. Table 2 gives a comparative summary of the findings regarding user demographics.

Table 1: Informal learners, formal learners and educators using iTunes U and OpenLearn

	iTunes U	OpenLearn
Informal learners	42%	48%
Formal learners	38%	33%
Educators	20%	16%
Both learner and educator	18%	23%

One of the initial reasons for providing free content at the OU through the William and Flora Hewlett Foundation-funded OpenLearn project was about social mission. For many over the last decade this has evolved into developing business models for open content production that still serve social mission, but also support students and teachers and bring informal learners into the formal student experience. It has also provided new insights into informal learning, adding to established ideas around the provision and motivation for work-based learning to include new methods and sources of free content and social online interaction that meet the needs of both professional and personal development. (Law et al., 2013)

Table 2: Comparing iTunes U and OpenLearn user demographics

	iTunes U	OpenLearn
What is your age?		
0-24 yrs	577 (27%)	120 (14%)
25-44 yrs	947 (44%)	333 (38%)
45-64 yrs	495 (23%)	330 (38%)
Over 65 yrs	125 (6%)	88 (10%)
What is your gender?		
Male	1345 (62%)	364 (41%)
Female	779 (36%)	515 (58%)
Other*	35 (2%)	2 (>1%)
Where do you live?		
UK	311 (14%)	533 (61%)
US	524 (24%)	27 (3%)
RoW	1324 (62%)	308 (35%)
Is English your first spoken language?		
Yes	1138 (53%)	682 (77%)
No	1021 (47%)	207 (23%)
What is your highest educational qualification?		
School	331 (15%)	139 (16%)
Vocational	121 (6%)	78 (9%)
College	366 (17%)	199 (23%)
Undergrad	604 (28%)	227 (26%)
Postgrad	617 (28%)	178 (20%)
None	120 (6%)	52 (6%)
What is your employment status? (Tick all that apply)		
Employed	1428 (66%)	504 (58%)
Voluntary	126 (6%)	40 (5%)
Student	577 (27%)	120 (14%)
Unwaged	169 (8%)	135 (16%)
Disabled unwaged	49 (2%)	37 (4%)
Retired	156 (7%)	127 (15%)
Do you have a disability?		
Yes	281 (13%)	168 (19%)
No	1878 (87%)	741 (84%)

* Other = 'transgender' and 'prefer not to say'

Whilst the demographic analysis of the 2013 study shows that the OU, through OpenLearn and the OU's iTunes U channel, is serving a largely educated group who have a keen awareness of the range of free educational resources available online, it is clear that the OU is also reaching groups of users that fall into the widening participation agenda in equal or larger proportions than the population in general (demonstrable for the UK).

Table 3 shows the motivations of iTunes U and OpenLearn users as revealed in the 2013 survey results, which indicated that a substantial number of informal learners using the OU's free content do so for work and/or professional development reasons – a factor that has greatly influenced the employability-related aspects of the university's badging pilots.

Table 3: Motivations of iTunes U and OpenLearn users

	iTunes U	OpenLearn
Personal interest	81.58%	81.74%
My professional development	40.28%	39.73%
Relevant to my studies	27.86%	19.63%
Relevant to my work	22.47%	30.59%
For the purpose of sharing with others	12.88%	17.35%
For the purpose of teaching others	11.85%	14.61%
Family interest	5.95%	8.22%
Relevant to voluntary work	4.82%	10.05%
Commercial interest	4.05%	1.83%

The 2013 study showed that learners are eager to have their informal learning achievements recognised in some way and also provided evidence that OpenLearn is providing a bridge to formal learning in several respects (Perryman et al., 2013):

- In leading informal learners to formal study with the OU and with other providers;
- In working as a showcase for the OU and increasing awareness of the learning opportunities and quality of provision offered by the university;
- In providing 'taster' materials that inform the paid-for module choice process;
- In allowing learners to test out university-level study prior to registering on a paid-for module;
- In broadening the range of subjects about which informal and formal learners are interested;
- In increasing users' study skills and confidence (thereby helping to increase existing OU students' performance and retention and potential students' readiness for study);
- In improving non-native English speaking students' language skills (and thereby helping with study preparation and retention).

Why develop badges for OpenLearn?

Through the development of a curriculum of assessed, badged courses aimed at employability and skills, the OU will augment its employability offering for both informal and formal (OU) learners via the OpenLearn platform. Pilot projects around badging at the University undertaken in 2013 were developed using the Mozilla Open Badge Infrastructure (OBI) (see <http://openbadges.org/>) and included recognition for learners' participation in a community activity, submission of a piece of work and completion of a particular task. In addition badges were awarded via three entry-level *Openings* courses on OpenLearn: *Learning to Learn* and *Succeed with Maths Parts 1* and 2.

The evaluation of these pilots has informed the development of a further project to deliver a suite of free, open courses of 24-hours learning, each of which are assessed through the deployment of a set of Moodle quizzes. The project aligns with the University's priorities and core values in that it:

- Aligns with the Journeys from Informal to Formal Learning strategy;
- Helps to provide accessible routes into the University for students who might not otherwise have the opportunity to participate in HE;
- Supports the OU Charter: ... "to promote the educational well-being of the community generally";
- Aims to deliver a high quality student experience in relation to careers services and employability skills development.

The evaluation of these badged *Openings* courses was performed through online surveys to participants at the enrolment stage and at the end of each course. The evaluation results demonstrated that (a) the IT infrastructure and the user experience of providing badges needs further development; (b) learners who achieved badges were highly motivated by the experience; and (c) the reworked *Openings* courses attracted learners who were more inclined to become students and were key to meeting the OU's widening participation agenda. Indeed, there were significant variations in relation to prior education, numbers of retired learners and numbers of learners reporting a disability compared to OpenLearn users overall:

- Only 36% of learners on the badged *Openings* courses already hold an undergraduate qualification or higher compared with 56% of the general OpenLearn learner population;

- 12% are retired compared with 20% of the general OpenLearn user population;
- 31% consider themselves to have a disability compared to 19% of the general OpenLearn learner population; 40% of *Learning to Learn* learners who completed the enrolment survey declared a disability;
- Of these learners, 38% report a mental health problem and 38% report an illness or chronic condition; 83% of *Learning to Learn* learners who say they have a disability, report a mental health problem.

What badges are being offered?

To mitigate perceived risks to the sector and the University of providing a badged OU curriculum on a bite-sized scale, badges are limited to employability and skills development. The following badges are proposed for development during 2014 using existing OU content and will be hosted on the OpenLearn platform:

1. First Steps in HE;
2. Succeed with Maths;
3. Succeed with Learning;
4. Succeed with English;
5. Skills for Work;
6. Career Development and Employability;
7. Digital Literacy;
8. Sport in Society.

A badge will be provided for successful completion of 24 hours of study (notionally eight weeks of learning at three hours per week, taken at the learners' own pace. This fits with current, recognised open course design used by the OU as part of its programme of MOOC delivery for the FutureLearn platform and will allow portability between platforms should any content developed as part of this project be deemed feasible for release as a MOOC on FutureLearn, OpenLearn or as an iTunes U course.

Content identified for these badges is a mixture of:

- Open content that has already been reworked for soft accreditation/assessment;
- Open content that exists as standalone text on OpenLearn (this forms the majority of badged content);

- Module content currently available to OU students.

Technical infrastructure

The badged courses will be provided free of charge to the learner and as such, this *class* of badge will remain free. Those achieving badges will be encouraged to display them through their public-facing profile on the OpenLearn website. In addition, registered students will be able to display both their informal learning and formal learning achievements together. To expand, learners who have logged into OpenLearn and have registered on a badged course will be able to earn badges by correctly completing a series of Moodle quizzes. The technical implementation proposed will allow users to display badges in the following ways:

- Their My OpenLearn profile, which will enable them to provide a public version via a shareable URL. The My OpenLearn profile will allow them to automatically share their achievements on Facebook (as a status update on their timeline), Twitter (as a Tweet) and LinkedIn (as an update);
- By the end of 2015, the OU Student Record (for registered OU students);
- By the end of 2016, in the Higher Education Achievement Record (for registered OU students);
- Their Mozilla Backpack should they wish to link to set one up <http://openbadges.org/display/>;
- Any WordPress blog.

Measuring impact

In order to monitor impact, badged open content will be evaluated for its efficacy to motivate and develop informal learners and to provide employability skills for formal OU students. This will form part of a longer term impact study. Key elements to be evaluated include:

- Users' experience of the process;
- Users' motivation for pursuing a badge;
- Users' ongoing motivation for formal study, informal study and/or further soft accreditation;
- Users' demographic profile;
- Users' reasons for engaging with the material but not the badging elements of it;
- How users have used their badges (a longer term evaluation).

Conclusion

Evaluation of the OU's pilot badging projects suggests that badging offers a way of reconciling informal learning and the demands of employers, and that badging content for university students and informal learners alike may become a key widening participation activity for HEIs. It has also become clear that the provision of a public-facing profile that acknowledges both formal and informal learning and can be shared through social media networks, is both achievable and desirable. While machine-based assessment may be perceived as "dumbing down" the achievement of gaining a badge, there is much to be developed and understood around peer assessment in the open and the use of graduate 'mentors' to help raise the bar. Further research in this area is needed and it is hoped that this paper will stimulate academic interest in the topic and will be of interest to HEIs globally, raising awareness of the opportunity to provide badges in HE and opening up the discussion around developing a known currency of non-accredited learning. In turn, it is hoped that this will contribute to a broader ongoing collective assessment of the impact of MOOCs and soft certification internationally, for example the impact on students' confidence and success in employability. The subject of the session is innovative in that there is little published research on the impact of badging globally, and even less research on the impact of badges in UK higher education/informal learning contexts.

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Distinctions between Computer Self-Efficacy of Pupils and Teachers in Elementary School

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Abstract

The aim of this study was to establish whether there are differences between the computer self-efficacy of pupils and teachers (N = 507) in the context of the classroom, as a developing workplace of the teacher in elementary education. The survey covered 184 teachers and 323 pupils in elementary school. The results show that there is no statistically significant difference in the Basic Computer Skills dimension. In other words, both pupils and teachers assess their own self-efficacy in Basic Computer Skills equally. Further, the results show a statistically significant difference of the medium effect size in Media-Related Skills. In other words, pupils assess their self-efficacy in this dimension higher than the teachers. The results also reveal a statistically significant difference in the medium effect size concerning the self-efficacy dimension of Web-Based Skills, i.e. the pupils' assessment of self-efficacy in the skill of internet use is higher than the teachers' assessment of self-efficacy in the same area. The results also show that pupils generally assess their computer self-efficacy more highly than the teachers do, which may be explained by the fact that these pupils are digital natives, belonging to what is known as the Net Generation, while their teachers are known as digital immigrants. This paper explains the implications of these results for modern multimedia student-centred classes, and the role of the pupil and teacher in such classes.

Abstract in Croatian

Cilj istraživanja je bio utvrditi postoje li razlike u računalnoj samodjelotvornosti učenika i učitelja (N = 507) u kontekstu nastave kao razvojnog radnog mjesta učitelja u osnovnom obrazovanju. Istraživanje je provedeno na 184 učitelja i 323 učenika osnovne škole. Rezultati su pokazali da ne postoji statistički značajna razlika u dimenziji Temeljne računalne vještine, tj. učenici i učitelji podjednako procjenjuju vlastitu samodjelotvornost Temeljnih računalnih vještina. Nadalje, pokazalo se da postoji statistički značajna razlika srednje veličine učinka u Vještinama

korištenja računalnih programa, odnosno učenici svoju samodjelotvornost u ovoj dimenziji procjenjuju višom od učitelja. Također, pokazalo se da postoji statistički značajna razlika srednje veličine učinka u pogledu dimenzije Vještine korištenja interneta, tj. učenici, tj. učenici svoju samodjelotvornost vještina korištenja interneta procjenjuju višom nego učitelji. Osim toga, rezultati ukazuju da učenici generalno procjenjuju svoju računalnu samodjelotvornost višom nego što ju procjenjuju učitelji, što se može objasniti time što su ovi učenici digitalni urođenici, odnosno učenici koji se nazivaju net generacijom, dok su njihovi učitelji ono što se naziva digitalnim doseljenicima. U skladu s tim rezultatima u radu se objašnjavaju implikacije koje oni imaju u suvremenoj multimedijskoj nastavi usmjerenoj na učenika te ulogu učenika i učitelja u njoj.

Keywords: pupils, teachers, teaching, teacher's workplace, elementary school, computer self-efficacy

Introduction

The workplace of a teacher in primary and lower secondary education (in state and private schools, or as a tutor) is specific in terms of the use of new media (new digital technologies). What is specific is that today's teachers organise the classes where pupils who were born in the new digital multimedia environment learn. Prensky (2001) calls these generations of pupils digital natives, also recently identified as the Net Generation (for example, Tapscott, 1999; Dziuban et al., 2010). Due to the characteristics of the multimedia environment in which these pupil generations were born and their informally developed competences in using the new media, these generations require a significantly different organisation of classes. These pupils require active methods of learning, and pupil-centred classes where they construct their own knowledge by interacting with the environment. In these kinds of classes, the teacher acts as a facilitator of the pupils' activities and the co-creator of their knowledge. The significance of modern pupil-centred classes is that they are organised, among other things, with the help of new media. This justifies the comparison between the teachers' competence in using new media and that of the pupils of the Net Generation. This is pertinent given the fact that some teachers have a lower level of competence in using new media, which calls into question the possibility of organising classes that satisfy the needs of today's pupils. Therefore, lifelong learning has become highly significant for a teacher's workplace, especially when it comes to in-service lifelong learning *for* and *with the help of* new media. The teacher's workplace allows teachers to learn in parallel with their pupils when organising classes

with new media. This type of lifelong learning (of teachers, but also of pupils) is defined as situated learning, which is explained by the situated learning theory.

Situated learning (Brown, Collins & Duguid, 1989; Lave & Wenger, 1996) which follows up on the postulates of activity theory (Engeström, Mietinenand & Punamäki, 1999; Leontyev, 2009) derives from the domain of constructivist theories of learning and is based on processes stimulating mainly informal and active learning, i.e. constructing learning. In line with this, learning is viewed as a social process of (co-)construction and reconstruction of knowledge in a social (cultural and historical) and physical (multimedia) environment. In addition to being an excellent framework for explaining lifelong learning (among other places, also in the workplace), situated learning is also significant from the new media aspect, especially when it comes to social media (generally, Web 2.0) (McDougall et al., 2010). New media require the user to be active, to research, to communicate and manipulate objects, etc., which are some of the elements of situated, or (socio) constructivist, learning. Situated learning is a learning process that appears simultaneously in work-related situations (e.g. in the workplace) where the learned abilities, values, skills and knowledge must also be applied (Brown, Collins & Duguid, 1989). Collins (1988, p. 2) defines situation learning as:

“the notion of learning knowledge and skills in contexts that reflect the way the knowledge will be useful in real life”.

One of the main features of situated learning is participation (Lave & Wenger, 1996), and what is known as a community of practice. This shows that situated learning is a learning process where, by applying what has been learned in real-life situations and by interacting with the social and physical (multimedia) environment, one learns and simultaneously applies what has been learned. The application of what has been learned activates new learning. Thus, a person (teacher) in his or her learning (work) process becomes what is known in didactic theories as a reflective practitioner (Hall McEntee et al., 2010), which is one of the specificities of the teaching profession and the classroom as the teacher’s workplace. According to Herrington, Oliver and Herrington (2007), learning situations are those that:

1. provide authentic contexts that reflect the way the knowledge will be used in real life;
2. provide authentic activities;
3. provide access to expert performances and the modelling of processes;

4. provide multiple roles and perspectives;
5. support collaborative construction of knowledge;
6. provide opportunities for reflection;
7. provide opportunities for articulation;
8. provide coaching and scaffolding; and
9. provide authentic assessment.

The teaching process, as a targeted and joint activity of the pupil and teacher, possesses all the above-stated characteristics of situated learning. What has turned out to be significant in the context of teachers' lifelong learning in the workplace with the help of new media is also their motivation, which is affected by their perception of their own computer self-efficacy. Computer self-efficacy may also be significant for teachers in view of the fact that they work with children of the Net Generation who were born in the multimedia environment and have very highly developed competences in using new media. In the context of situated learning, as an operative form of lifelong learning, computer self-efficacy is a very important factor for teachers since they learn, among other things, also in collaboration with their pupils with the help of new media.

Computer self-efficacy

What is significant for using new media at work (in this case, in class) is the very decision to organise learning with the help of new media. According to Moos and Azevedo (2009), motivation also affects the decision to (successfully) use and learn with the help of new media. This motivation, among other things, expresses itself as perceived self-efficacy in using new media. In other words, when using new media to organise classes and learning, and in the workplace, what is important is (perceived) computer self-efficacy. The theory of computer self-efficacy is not completely original. It derives from Bandura's theory of self-efficacy (1977). Computer self-efficacy concerns one's own perception of the ability to use a computer in order to successfully perform a particular task (Murphy, Coover & Owen, 1989). The computer self-efficacy theory is also useful to explain the successful performance of work tasks, as well as learning with the help of computer technologies, because it is applicable in different social situations where people use IT, including in the workplace.

Thus, Hill, Smith and Mann (1987) were amongst the first to carry out research of computer self-efficacy in order to find the relation between computer self-efficacy and the decision to use a computer. The study was conducted on 304 pupils. The results show that higher computer self-efficacy is related to more positive and more frequent

experience in using the computer, as well as with future more frequent use of the computer and other digital technologies. In the end, the authors conclude that the use of a variety of IT can be predicted through computer self-efficacy based on positive and frequent previous uses of the computer. Whitley (1997) obtained interesting results in a meta-analysis of computer self-efficacy and computer perceptions in the territory of Canada and the USA on a sample of secondary-school pupils on one hand, and university students and adults on the other hand. The results of the analysis showed that pupils in higher secondary education had a more positive affective perception of computers and a higher level of computer self-efficacy than university students and adults. Brosnan (1998) carried out a survey on computer-related anxiety and computer self-efficacy and their effect on the performance of tasks on a computer using a sample of 50 students in the UK. The results of the survey show that the lower the computer-related anxiety, the larger the number of resolved tasks; and the higher the level of computer self-efficacy, the more students are able to predict particular actions and control work on the computer. Salanova et al. (2000) carried out a study on the effect of the level of training for work on the computer and the frequency of the use of computers and computer self-efficacy on work burnout in Spain on a sample of 140 adults working on a job requiring the use of IT. The results show that better training in using the computer and more frequent use of the computer may be considered as predictors of a higher level of computer self-efficacy. Further, persons with a low degree of computer self-efficacy more often exhaust themselves in circumstances where they have to frequently use the computer. The results show that a higher degree of computer self-efficacy in jobs that require the use of IT may reduce the work burnout syndrome. Potosky (2002) conducted a survey on the perception of computer self-efficacy as an outcome of computer training in 56 respondents with specific knowledge and skills in using the computer at work, and their computer playfulness. The results show that a perception of higher abilities and knowledge of application is related to a higher degree of computer self-efficacy. Moreover, the results indicate that a higher degree of computer playfulness and a better perception of one's knowledge may be considered predictors of a higher degree of computer self-efficacy. It was also shown that respondents who express a higher degree of computer playfulness have a higher degree of computer self-efficacy. Deng, Doll and Troung (2004) conducted a survey on the significance of computer self-efficacy in new and unknown situations of applying IT on 153 IT engineers. They wanted to grasp the significance of personal autonomy, cooperative support and learning capacities in computer self-efficacy. Their further goal was to find out the relation between computer self-efficacy and intrinsic motivation in conjunction with the efficient use of

IT. The result was that intrinsic motivation has a significant effect on computer self-efficacy in the successful resolution of tasks. Furthermore, a person's autonomy, his or her ability to learn (the ability to adapt) and collaborative assistance (the assistance of associates) also have a significant role on the application of IT in new and unknown situations to resolve particular tasks. This shows that computer self-efficacy still has a significant role in the use of computers and in resolving IT-assisted tasks, but this is not restricted to previous experience in using the computer, since there are also other determinants, such as personality traits, learning ability, ability to work in a team, etc.

These theoretical concepts and research results show that the nature of the teacher's workplace, i.e. the classroom, conforms to the postulates of situated learning. On the other hand, lifelong learning happens *in situ* at the workplace. As far as the teacher is concerned, this is the classroom where such processes of work and learning occur in cooperation with the pupils. In addition, it is impossible to view the modern organisation of Net Generation pupil-centred learning outside the context of the use of new media. Therefore, it is fair to compare the teacher's and the pupils' competence in using the new media, that is, their computer self-efficacy, which, according to the above-mentioned research, may be significant for the organisation of work (teaching in class), but also for the teacher's workplace itself.

Therefore, this research was conducted with the purpose of comparing computer self-efficacy in teachers and pupils in elementary school.

Method

Sample

The sample (N = 507) consists of elementary school teachers and pupils, including 323 eighth-grade pupils and 184 class and subject teachers in Croatia. In terms of the pupil subsample, there were 157 (48.6%) male pupils, and 166 (51.4%) female pupils. In terms of the teacher subsample, there were 23 (12.5%) male teachers, and 161 (87.5%) female teachers. A total of 73 (39.7%) teachers work in town schools and 111 (60.3%) work in village schools. In terms of their workplace, 66 (35.9%) are class teachers, 116 (63.0%) are subject teachers, and 2 (1.1%) work in extended stay programmes. With regard to their experience, it ranged from total beginners (0 years of work experience) to 44 years of professional experience, which gave an average of 15 years of professional experience.

Instrument

The computer self-efficacy scale (Teo & Ling Koh, 2010) consists of twelve manifest items. Each item was measured on a five-point Likert scale with (1 = strongly disagree; 2 = mainly disagree; 3 = undecided; 4 = mainly agree; 5 = fully agree), made up of three latent factors. The Basic Computer Skills factor contained five manifest statements, the second factor, Media-Related Skills contained four manifest statements, and the Web-Based Skills factor contained three manifest statements. The instrument was constructed in such a way that it was decontextualised with regard to any individual digital device. An explanatory factor analysis of principal components was carried out, with saturation points exceeding 0.3, and by using the oblim rotation, with the aim of assessing the construct validity. Bartlett's test of sphericity amounted to 0.000, and KMO = 0.915. Three factors emerged as in the original structure of the instrument, which jointly explain 72.62% of the total variance. The Basic Computer Skills factor explains 49.27%, the Media-Related Skills factor 18.39%, and the Web-Based Skills factor 4.95% of the total variance. One statement from the Basic Computer Skills factor had a significant saturation in the Media-Related Skills factor. This shows that the instrument replicates the original factor structure on the sample of Croatian respondents in a satisfactory manner, although the original structure was used in the order and with a number of manifest statements concerning some factors according to Teo and Ling Koh (2010). Satisfactory reliability was achieved in all the factors. The Basic Computer Skills factor shows a reliability of $\alpha = 0.883$ ($M = 4.294$; $Sd = 0.900$; $min = 1$; $max = 5$); the Media-Related Skills factor $\alpha = 0.880$ ($M = 3.011$; $Sd = 1.194$; $min = 1$; $max = 5$); and the Web-Based Skills factor $\alpha = 0.779$ ($M = 3.143$; $Sd = 1.201$; $min = 1$; $max = 5$).

Procedure

The research was carried out from February to April 2013. Both subsamples filled in the survey questionnaire by using the paper-pencil method. The completion of the questionnaire was fully voluntary and anonymous.

Results

In view of the aim of the research and the structure of the applied instrument, the results are analysed in two steps. The first step consists of an analysis of the difference related to the overall concept of computer self-efficacy. The second step, with a view to obtaining results that are as detailed as possible, consists of an analysis of differences by each separate factor of computer self-efficacy. By applying the Mann-Whitney U test, a level of significance of $p < 0.01$ showed that there is a statistically significant

small difference in computer self-efficacy (on the entire instrument) between pupils and teachers ($U = 20318.50$; $p = 0.00$, $Z = -5.927$; effect size $r = 0.263$). In other words, the pupils ($M = 3.744$; $Sd = 0.916$; Mean Rank = 283.1; $Md = 3.91$) perceive a higher level of computer self-efficacy than the teachers do ($M = 3.287$; $Sd = 0.806$; Mean Rank = 202.9; $Md = 3.33$). Descriptively analysed, although pupils assess their computer self-efficacy higher than the teachers, the arithmetic means show that both subsamples assess it as mediocre in general. With a further analysis of differences with regard to any latent dimension of computer self-efficacy, the following results were achieved. There is no statistically significant difference in the dimension of Basic Computer Skills ($U = 27586.0$; $p = 0.169$, $Z = -1.374$; effect size $r = 0.061$), i.e., pupils ($M = 4.224$; $Sd = 0.954$; Mean Rank = 247.4; $Md = 4.6$) and teachers ($M = 4.409$; $Sd = 0.789$; Mean Rank = 265.6; $Md = 4.8$) assess their own self-efficacy in Basic Computer Skills equally. Although there is no difference, the arithmetic means show that both samples assess their Basic Computer Skills as above average. A further result is that there is a statistically significant difference in the medium effect size in Media-Related Skills ($U = 16013.0$; $p = 0.00$, $Z = -8659$; effect size $r = 0,384$), i.e., pupils ($M = 3.362$; $Sd = 1.129$; Mean Rank = 296.4; $Md = 3.5$) assess their self-efficacy in this dimension higher than the teachers ($M = 2.406$; $Sd = 1.043$; Mean Rank = 179.5; $Md = 2.25$). The arithmetic means show that pupils assess their Media-Related Skills as average, while teachers assess themselves as below average. It also resulted that there is a statistically significant difference in the medium effect size with regard to the Web-Based Skills dimension ($U = 17693.50$; $p = 0.00$, $Z = -7.610$; effect size $r = 0.337$), i.e., pupils ($M = 3.744$; $Sd = 0.916$; Mean Rank = 291.2; $Md = 3.67$) see their self-efficacy in using the internet as higher than the teachers ($M = 2.590$; $Sd = 0.806$; Mean Rank = 188.7; $Md = 2.67$). The arithmetic means show a tendency for pupils to consider their Web-Based Skills as above average, while teachers consider their own Web-Based Skills as below average or average.

Discussion

The results show that in general pupils assess their computer self-efficacy more highly than the teachers, which can be explained precisely by the fact that these pupils are digital natives, also identified as the Net Generation, while teachers are what Prensky (2001) calls digital immigrants. These results are in line with the results of Whitley's (1997) meta-analysis, which indicate that younger generations, or pupils, show a higher level of computer self-efficacy than the older generations, or teachers. Therefore, this result is a fair one, especially since these pupils were born in a multimedia digital environment and have not experienced (lived through) the

development and transformation of ICT and the multimedia environment in general. This transformation and the associated sudden changes may be stressful, which can explain the lower computer self-efficacy of teachers.

Naturally, these results must be interpreted cautiously, especially with regard to further analyses related to each specific dimension of computer self-efficacy. Thus, it shows that there is no difference between pupils and teachers in basic computer skills, such as searching for information on the web, using writing programs (e.g. Microsoft Word), using spreadsheets and displaying data (e.g. Microsoft Excel) and in using email. This result is justified by the fact that these abilities have become necessary for everyday life. The probable reason for both subsamples to assess these skills as average is precisely because these are regular (basic) computer skills.

On the other hand, the results show that pupils express a higher level of computer self-efficacy in the skills of using various types of computer software (Media-Related Skills), such as editing programs for designing websites, programs to make video and audio recordings, graphic design and animation programs. They also show that pupils have a higher level of computer self-efficacy than their teachers when it comes to Web-Based Skills, such as blogs and personal profiles on social networks (e.g. Facebook, Twitter), using video conferencing online programs (e.g. Skype) and online learning platforms (e.g. Moodle). Although account must be taken that these differences are not large, which is shown by the effects size, they are moderate. These results are explained by the fact that these are skills inherent to today's children in their everyday social communication and socialisation, which, to a large extent, takes place through new media. These skills are essential for the needs of today's children, and skills that Ito et al. (2010) consider "normal" for the children of today in their needs, such as friendship, play, work, family, intimacy and creativity. In other words, in order for today's children to satisfy their social needs, they also need these abilities. These arguments, as well as the complexity of use of computer programs and the internet, are possible reasons for pupils to consider that their Media-Related Skills and Web-Based Skills are higher than the same skills of the teachers, since they assess their skills as average, as opposed to the teachers who assess them as below average. These abilities are also used by pupils in the context of social media, which include activities such as playing, showing, simulating, multitasking, negotiating, networking, evaluating, etc., which are some of the features of the participating culture mentioned by Jenkins (2006), and it is precisely this participating culture, according to Lave and Wenger (1996), that is one of the key elements of situated learning.

A comment must be made about these results in that it should be taken into consideration that both pupils and teachers show a higher level of computer self-efficacy in Basic Computer Skills in comparison to Media-Related Skills and Web-Based Skills, which is shown by the arithmetic means of all subsamples. This can be explained by the fast development and changes of computer software and social media, which always require new and different user skills. These computer abilities have not been acquired by pupils in formal education, but rather by informal social participation in the multimedia environment, or situated learning. Therefore, in view of these results, it is justified to consider that today's pupils, as opposed to their teachers, generally show better abilities in situated learning with the new media, which is one of the key characteristics of the teacher's workplace (class).

Conclusion

The research shows that pupils in general express a higher degree of computer self-efficacy than their teachers. Teachers and pupils assess their self-efficacy in basic computer skills equally, since these skills have become essential in everyday life. Pupils show a higher level of self-efficacy in using special computer software and higher skills in using the web, since these skills allow pupils today to engage in social communication and socialisation, and they meet their social needs, which confirms they have the characteristics of the Net Generation. It follows that the teacher's workplace (class) in terms of the multimedia (learning) environment includes the organisation of the learning experience for pupils who have identified themselves with the digital multimedia environment. Therefore, modern pupil-centred teaching also implies the organisation of teaching with new media. Since teachers in general show a lower level of computer self-efficacy, which according to today's research is significant for this workplace, the quality of teaching is brought into question. This sets certain challenges before teachers and their workplace in the form of lifelong learning and professional development. Teachers can achieve a high quality of teaching with new media by simultaneously learning how to use and by applying new media in organising classes, which takes place in the context of situated learning. These results also show that future teachers in initial training in teacher education studies have to be prepared to organise pupil-centred classes with new media based on the theory offered by multimedia didactics.

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