

INFOGRAPHIC POSTERS FOR ENHANCING 21st CENTURY COMMUNICATION SKILLS

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ABSTRACT

One of the problems among graduate students in a research methodology course is reading large numbers of articles during the course. Reading many research articles is required for an overview of current research methods and to determine the contribution of the findings to the field of knowledge. However, this task is overwhelming for students who felt that it was not meaningful reading these articles. Hence, one method to make the task meaningful is for students to present these reading assignments as an infographic and shared among the students in the course. In this way more students would be able to have access and read more research papers. In this study, a case study methodology was employed to investigate the case of **four** students who used infographic posters for presentation in the classroom. The students participated in the reading assignment and summarized the information in an infographic poster, which was shared on the course platform. The findings indicate that the learners developed the 21st century communication skills as well as literacy skills for summarizing main points. In addition, the other students in the course also managed to view the research papers in the infographic poster. In conclusion, infographic posters could be used for enhancing communication skills. Further research should be done to determine if it could be implemented in other courses and in enhancing other skills among learners.

Keywords: communication skills, infographic posters, 21st century learning, technology in education, online learning

Themes: Technology use in education

Introduction

Communication is considered as an important life skill. UNICEF (2003) defines life skills as the psychosocial ability to adapt and exhibit behaviors to deal with the demands and challenges of life, and include cognitive skills for analyzing and using information; personal skills for developing personal agency and managing oneself; and inter-personal skills for communicating and interacting effectively with others. The World Health Organization (WHO) identified five basic areas of life skills which were considered relevant across cultures: decision-making and problem-solving; creative thinking and critical thinking; communication and interpersonal skills; self-awareness and empathy; coping with emotions and coping with stress (Department of

Mental Health, 1999). Further, the Report of the Inter-Agency Working Group on Life Skills headed by UNESCO considers that there needs to be a life skills approach for quality education for human development (UNESCO, 2004). A life skills-based approach to education should cover the individual dimension; the social dimension; the cognitive / reflective dimension; and the instrumental dimension (UNESCO, 2004). Hence, a well-developed communication skills, problem-solving skills, motivation, persuasion, and critical thinking skills are the soft skills of the 21st century (MacDermott & Ortiz, 2017). Soft skills are required for employability as they are required for tasks such as managing and working with people as well as to ensure customer satisfaction and loyalty (MacDermott & Ortiz, 2017). Social skills, namely communication, have been emphasized in a life skills definition. Hence, communication skills is required in the 21st century.

In addition, innovative methods to improve teaching standards will enhance the opportunities in life among students for economic growth so as to meet the continued demand for highly skilled employees (DBSI, 2016). The need for a competitive and innovative higher education system is also reflected in Asia. This is because a quality higher education systems provides the environment for developing skills and capacities as well as foster research and technological innovation (World Bank, 2009). In Malaysia, the Malaysia Education Blueprint for Higher Education 2015-2025 also aims for Malaysia to be globally competitive in higher education by ensuring innovative pedagogies for instruction is provided in higher education institutions (HEI). In line with this, HEIs need to explore new and innovative instructional strategies to develop better skills and capacities among learners.

In this context, an instructional problem was selected so that so that an innovative teaching strategy could be explored. In teaching research methodology courses, instructors find it challenging as they face several instructional problems. Firstly, most students find the course materials difficult to understand (Hovell, Adams, & Semb, 2008; Rock, Coventry, Morgan & Loi, 2016). This is because the content matter and the terms used were new to these students (Ball & Pelco, 2006). The language used for communication was difficult to understand as academic writing had its own particular format and structure (Ball & Pelco, 2006). Next, most students also found the quantity of content and the readings to be done in a research methodology course was too much (Ball & Pelco, 2006). Students tend to spend more time in understanding the content and required to be scaffold to comprehend the content. Collaborative learning methods may be used to scaffold and support the learners in understanding the content. Without effective instructional methods, students experienced more difficulties in learning (Hovell et al., 2008). Hence, effective and innovative instructional strategies are required to address these problems.

Many students become disinterested in learning research methodology and were not motivated to learn (Ball & Pelco, 2006; Hovell et al., 2008). They did not see the need for research skills in their future jobs (Hovell et al., 2008). Some, on the other hand, developed anxiety in learning this course (Rock, et al., 2016). Hence, a new and innovative instructional method which may provide some fun to motivate the learners and reduce anxiety is required.

In a research methodology course, communication is one of the core skills. Students need to present their research effectively in both oral and written forms. However, the difficulties in using the unfamiliar vocabulary and terms for communication may be a problem (Hovell et al., 2008). Effective communication in the 21st century needs to consider media and information literacy as well. Hence, the instructional strategy developed should allow for the development of these literacies.

In order to address the issues on the difficulty of the topic, the need to motivate the learners, and to develop communications skills, an online technology tool will be considered. Although technology has been used in teaching research methods courses, the technologies investigated were mostly general in nature, example e-learning on learning management systems (Rock, et al., 2016). However, there is still a need for new pedagogies that allow instructors to use the potential of eLearning tools. Hence, in this study, a pedagogy for teaching research methods using an easy-to-use online poster development tool is suggested. The tool was selected for the students to summarize their reading assignments and develop infographics for presenting their assignments. The purpose of the study was to investigate whether developing infographic posters could develop students' 21st century communication skills, and to explore students' perceptions in the use of infographic posters for learning in the context of the study using the following research questions: How does developing infographic posters develop students' 21st century communication skills? What are the students' perceptions in the use of infographic posters for learning in the context of the study?

This study would be significant as it would determine whether students in HIE were willing and able to use this technology in their reading and presentation tasks. This would be a innovative strategy which could be used to develop both communication and media information literacy skills, useful in the 21st century.

Collaborative learning

Collaborative learning is the acquisition of knowledge, skills and attitudes through group interactions (Johnson & Johnson, 2004). Collaborative learning has been shown to improve memory and contributes to the building of knowledge and at the same time engage and motivate learners (Bligh, 2000; DeWitt, Alias, Siraj, & Zakaria, 2014). During the processes of collaborative learning, new ideas are generated for knowledge-creation (Palloff & Pratt, 1999; Rogers, Connelly, Hazlewood, & Tedesco, 2010; So, Tan, & Tay, 2012). During the interactions for collaborative learning, support from their peer helps to scaffold learning (Boticki, Looi, & Wong, 2011; Timmis, 2012). As the learners interact, both face-to-face and online, and reflect on their discussions, a learning community for sharing learning experiences is built (So & Bonk, 2010, Palloff & Pratt, 1999). Collaborative tools for learning such as wikis, discussion forums and text messaging, enable the interactions to be increased for learning science (DeWitt, Alias, & Siraj, 2014).

Although technology tools have been used to support collaborative learning, there does not seem to be any studies employing posters for this form of learning. In teaching courses in higher education, information has been presented to learners using technology in the form of videos and *Powerpoint* presentation slides. In addition, ready-made posters from repositories like *Pinterest* have been used to present information. However, there are few studies which investigates learners developing materials for learning.

Studies in using technology for producing materials, have mainly focused on producing videos and *Powerpoint* presentations. However, few studies have been done where learners produce posters. An infographic poster developed by the learner has a lot of information. The learner needs to summarize the information and present it in an interesting and casual manner. In developing posters, the learner needs to have the skills to summarize and decipher main points and highlight them in an interesting manner.

The use of technology has contributed to attitude formation (Teo & Zhou, 2014). When learners have a successful experience and effective support in using technology, the intention to use the technology will be enhanced. In addition, the perceived usefulness of the technology intervention is very much influenced by the ease of use (Teo & Zhou, 2014). Hence, in this study it would be important to determine the perception on the difficulties in using this online poster tool, *Canva*, to determine if it could be used for future interventions.

Posters are static presentations. However, it is believed that when the learner shares the posters they produce in a collaborative learning environment, the format of reading and presentation is changed and becomes less boring. Articles which were assigned for reading and need to be presented can be more engaging when done in the form of an infographic poster. Information can be presented in an interesting and casual manner using infographic posters. Further, there is the possibility of sharing the infographic posters on discussion forums, or in text messaging applications such as *Whatsapp* to be evaluated by the community of learners. This makes the activity meaningful and the learner is accountable for information shared. In this way, collectively, the group has had more readings done. Poster development can be done using ready-made templates from poster development tools such as *PosterMyWall*, *Fotor*, *Piktochart* and *Canva*, which requires less technical skill than traditional poster development tools such as *Adobe Photoshop*. Further, there are more attractive design templates for the learner to use.

Communication skills in the 21st century

The need to be technology-savvy in communication has arisen because the way we communicate in the 21st century has changed when compared to a century ago. In the present time, we seldom write letters to be posted. Instead, emails are the most popular means of online communication today. We also share our thoughts with friends, not through face-to-face communications or even phone calls, but using text messages on *Whatsapps*, or posts on *Facebook* and *Instagram*. We may use video calls on *Facebook*, *Skype* or *Hangouts*, and leave voice-recorded messages on *Whatsapps* on our mobile. We are living in a media-rich environment, and hence, we need to be technology savvy as well.

The framework for 21st century learning defines the ability to communicate clearly as being able to do the following: (1) articulate thoughts and ideas using oral, written and other nonverbal communication skills in a variety of forms and contexts; (2) to decipher meaning in terms of knowledge, values, attitudes and intentions from listening effectively; (3) to use communication for a variety of purposes; to utilize different media and technologies and judge their effectiveness; and to communicate in diverse environments (P21, Partnership for 21st century Learning, 2017). This means that communication in the 21st century is not just communicating in oral and written forms, but includes other non-verbal communication.

Oral communication includes listening and speaking while written communication would include reading and writing. In addition to the skills in the language, communication skills includes the ability to comprehend meaning when listening effectively, as well as being able to use a variety of different media and technologies. This means that the graduate should be able to decide on the effectiveness of technology tools for communication. For example, he would need to know that videos would be effective for conveying emotions and other non-verbal information, while posters would only be able to convey 2-dimensional graphics and textual information. The graduate with efficient communication skills would be able to decide how he needs to present information to his audience, using different media to capture their attention, and

convince them. He should be able to present to different types of audiences, using the most appropriate tool - *Powerpoint* presentation, a video or a poster.

This means that communication in the 21st century has changed tremendously as it is influenced by media and technology. In face-to-face communication, we used to pay attention to non-verbal cues in facial expressions, but in the 21st century, we need to be sensitive to textual and graphical symbols, which may include emoticons and graphics that are being used in communications to interpret messages.

Method:

This study is a qualitative case study of the implementation of four online tools for learning in a postgraduate course. The phenomenon of interactivity in the use of the tools are explored in this context using Robert Stake's (1995) approach in an intrinsic study whereby the purpose is not to develop theories nor to understand abstract constructs, but to better understand the case of using these online tools where the issue of interactivity needed to be addressed (Baxter & Jack, 2008). The findings of the case cannot be generalised to other cases because it is specific in its context but can be instrumental in gaining understanding (Baxter & Jack, 2008; Stake, 1995). However, in instructional design research, context is important for relevant research in the field (Oliver, 2014).

Context and participants

The context is Masters course in research methodology in the Faculty of Education in a public university. The course participants were working adults who were teachers and lecturers. The postgraduate course was selected because it was believed that postgraduates were matured students and could contribute richer experiences. Although, the participants might not be digital natives as compared to undergraduates (DeWitt, Naimie, & Siraj, 2013), they were enrolled in the instructional technology program, and hence, had experience in using technology and were positive on technology use.

The three participants who formed the case were selected for the study was done through non-homogenous purposive sampling for maximum variation (Patton, 2002). Participant P was a school teacher, Participant Q an instructor in technical vocational college, and Participant R a lecturer in a higher education institution were selected. Participation was entirely voluntary and participants were informed that their opinions on the online tools used were important and would be used as data in a study.

Data collection

Data collection was done using a semi-structured interview protocol with the participants identified for the case. In addition, data was collected from the online discussion forums, observations and records in the researchers' journal as well as the students' product.

A checklist for analysing 21st century communication in the data collected was used for content analysis. Based on the framework for 21st century learning outlined by P21, Partnership for 21st century Learning (2017) there are 3 domains of communication skills which are: (1) articulate thoughts and ideas using oral, written and other nonverbal communication skills in a variety of forms and contexts; (2) to decipher meaning in terms of knowledge, values, attitudes and intentions from listening effectively; (3) to use communication for a variety of purposes; to

utilize different media and technologies and judge their effectiveness; and to communicate in diverse environments. The content analysis was based on these domains.

Finally, the researcher was a participant observer and recorded observations of the interactions with the online tools (Baxter & Jack, 2008; Stake, 1995).

Procedure

The study was conducted for over three weeks during the course. In the first phase, an introduction to the task that had to be done and to the technology tool was done. An article from Morrison and Ross (2013). *Research-Based Instructional Perspectives* J.M. Spector et al. (eds.), *Handbook of Research on Educational Communications and Technology*, 31-38 was used. The course participants were shown an exemplar: the article and the poster summarizing the main points. The technology tool, *Canva*, was introduced. The participants then had to sign in for their *Canva* accounts and explore the tool. The participants were then given their reading assignments (see Appendix 1). They had to summarize the articles in the poster for the following week.

In the second phase, the participants had to draw out the main points from the articles. Then the production phase, when they had to select a suitable template to present the information in the form of a poster. The fourth phase involved presenting their poster to the other course participants in class where their peers would ask questions after the presentation. The elaboration as they answered their peers questions enabled communication, and the posters were later shared on online platforms such as the course Learning Management System and on the course *Whatsapp* text messaging application.

Throughout the period, observations were made and recorded as the researcher's field notes. At the end of presentation and sharing, the participants were interviewed separately and the interview was audio-recorded. After the interviews were completed, the audio recordings were transcribed for analysis. In addition, transcripts of the online communications were transcribed and coded using content analysis.

Data analysis

The data from the transcripts of the interviews, the online discussion forum, and observations from the researchers journals were transcribed, coded and analysed according to themes using content analysis to answer the research questions (Mostmans, Vleugels, & Banner, 2012). However, only aspects of the case relating to the salient and emerging themes in the study are reported according to the scope of the study.

Reliability

The data which was collected from the interviews was triangulated with documentation of the interaction on the online tools and observations during presentations. In addition, the participants were selected from different background and experience in teaching using technology to ensure a wide range of opinions were gathered. These procedures ensured reliability and credibility of the data in an online learning environment (Mostmans, et al., 2012).

Findings and discussion

The data on the use of four online tools was analyzed according to themes in order to answer the research questions. For the first research question, how does developing infographic posters develop students' 21st century communication skills?

Analysis of communication skills in developing infographic posters

In the analysis of the posters produced and shared, it was seen that the learners managed to successfully summarize the main points of the articles (see Figure 1).

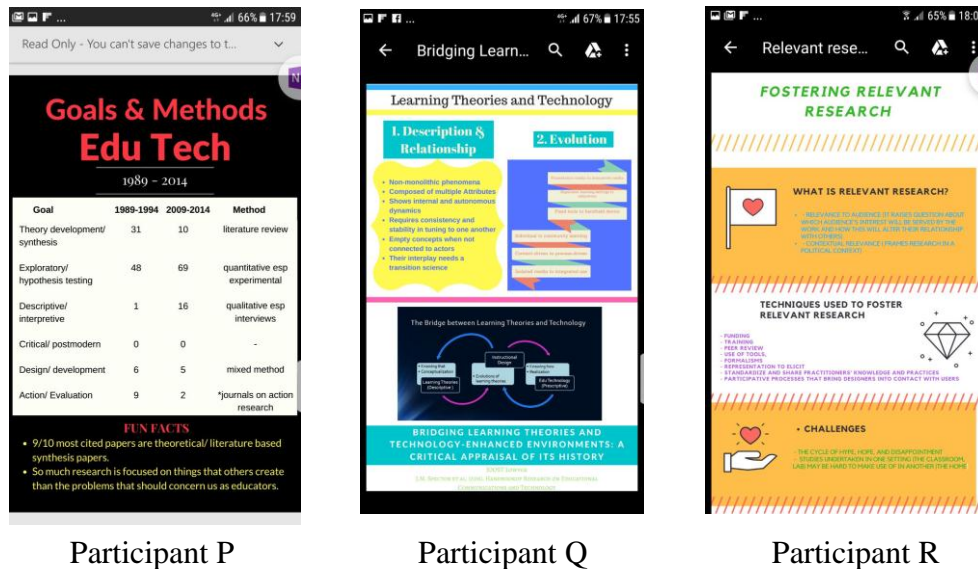


Figure 1: Posters produced by participants

In producing the posters, the participants fulfilled part of the 21st century communication skills. In domain 1, it was partially fulfilled when articulating thoughts and ideas was done in written and graphic forms, and fulfilled in domain 3, which is utilizing different media and technologies (see Table 1). However, there was no oral presentation, and listening elements involved in producing the posters.

However, when the students presented their work to the class, they had to articulate their ideas orally, which is the first domain. In addition, they had to decipher feedback from listening effectively, to determine the knowledge required, as well as the attitude and intention of the audience in interpreting their presentations, which the second domain.

An example of the interpretation can be seen from this interaction. Participant P was asked by X: “What do you mean by mixed method methodology?” P verified during the interview, “I had to interpret the intent of the question, whether X wanted to know the definition or wanted to know the process of the research, or whether it was to accuse me as wrong. I am going to answer as content”. Her answer was, “Mixed method is using both qualitative and quantitative methods of research.” And the enquirer said, “But what is the purpose of mixed method design? You put your goal as design or development. I think that this is wrong”. P had to reinterpret the communication as it was now accusing her as being wrong in her analysis, “Now I know where this was going to,” and she said, “So what should it be?” Enquirer X answered, “It should be qualitative and quantitative. Mixed method may confuse others.” P responded, “Thank you, I will take that into consideration.” Hence, in this anecdote, P had to listen to decipher meaning, inquiry for understanding, and communication to gather information and to communicate intent. All the domains of 21st century communication skills was being addressed.

During this interaction, collaborative learning was occurring as there was support from peers to scaffold learning (Boticki et al., 2011; Timmis, 2012). In contributing to the building of knowledge, the learners could as the learners interact and reflect on their presentations, they form part of a learning community for sharing and building experiences (So & Bonk, 2010, Palloff & Pratt, 1999).

To further support the online community the summary of the discussions were put online by the instructor to reinforce and further support the learning. It was noted in the discussion forum: “As you have noticed, empirical research is important and when design and developmental studies are undertaken, different methods are employed. I won’t call it mixed-methods, but a variety of quantitative and qualitative data can be collected.” Hence, further support to scaffold learning was provided by the instructor (Boticki et al., 2011; Timmis, 2012).

Table 1: Analysis of communication capabilities among the 3 participants in producing and presenting infographics in a collaborative online environment.

Domain	21 st century communication	P1	P2	P3
1	Articulate thoughts and ideas orally*	√	√	√
1	Articulate thoughts and ideas in written form	√	√	√
1	Articulate thoughts and ideas other nonverbal communication	√	√	√
2	Decipher from listening effectively, meaning in terms of knowledge*	√	√	√
2	Decipher from listening effectively, meaning in terms of values, attitudes and intentions*	√	√	√
3	Utilize different media and technologies	√	√	√

*During presentation for collaborative learning.

For the third domain, in utilizing different media, Participant Q inserted graphics in addition to text in the template, indicating higher level skill in using of technology. Participant Q had the most experience in the use of technology and could produce graphics for the presentations. More interesting was Participant R, who was averagely skilled in technology by managed to produce a poster and inserted ready-made icons. Only Participant P used text and a table to display the information. However, tabulating the information also involved skills of summarization and display in different formats. Hence, all the participants seem to be successful in integrating different media in their posters.

In conclusion, developing infographic posters develops 21st century communication skills in all domains when it is used in a collaborative learning environment, when learners ask questions, interact, and defend their arguments. The posters contain graphic and text elements and when the participants present their posters, they are verbally articulating their thoughts in the poster. In addition, there was communication for understanding and to convey information. Different media was used, namely text and graphics, and the communication continued online in social media and the learning management system.

What are the students’ perceptions in the use of infographic posters for learning in the context of the study?

Perceptions in the use of infographic posters

When the task was first presented to the course, the course members were first taken by surprise. Then there was a question in the online forum on the LMS in response: “Are you giving our assigned articles to read during our class or do you need us to post here? I mean, are we going to read all those articles and made a *Canva* for each?”

After using *Canva* for developing their posters they were excited on using it. Participant R who was less technology-savvy said: “Wow... The *Canva* is interesting and quite useful to summarize on certain topic/ journal reading... Will introduce to my students... Thanks.” This is important to note as the participant who was less technology-savvy found it useful and would recommend using it.

Participant Q was skilled in using technology and also found it useful: “Yes, it is really useful. It's like the mini version of Microsoft publisher and Adobe IDD with lighter graphical properties and easier to use but of course with limited features as it is only a "mini" version but enough to make a summary and outline of lessons.”

The perception on the use of the tool is important as it will contribute to attitude formation and the perceived ease of the tool (Teo & Zhou, 2014). This was obvious as participant R found the tool easy to use and hence felt that it would also be useful for his students (Teo & Zhou, 2014).

Conclusion

In developing and presenting their infographics among a community of learners in the context of the course, the learner was able to develop their communication skills. The communication skills were measured in the framework of 21st century learning **in three domains**. The learner seemed to be able to articulate their thoughts and ideas using oral, written and other nonverbal communication skills in a variety of forms and contexts; had to decipher meaning in terms of knowledge, values, attitudes and intentions from listening effectively; and had to use communication for a variety of purposes, to utilize different media and technologies and judge their effectiveness, and to communicate in diverse environments. Hence, the use of infographics in a collaborative learning environment seem to have potential for developing communication skills required in the 21st century. However, it is not known how effective the communication was, as the assessment of the quality of the communication was not part of the scope of the study.

attitudes and perceived usefulness exerted significant direct influences in students' intention to use technology.

It follows that there should be a coherent strategy to integrate technology into the teaching and learning environment where students witness technology being harnessed in all aspects of the institution, including lesson delivery, student administration, assessment and grading, and communication. For students to perceive technology to be useful, they need to see evidence of becoming more productive and effective

learners when engaging with technology. This involves saving time, getting more work done with less effort, quick access to information for study and assessment, and advanced planning to get ahead of competition.

Explaining the intention to use technology among university students: a structural equation modeling approach.

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Timothy Teo · Mingming Zhou (2014).

From the perspective of attitude formation, when students feel supported by adequate and effective support structures to enhance their use of (and provide them with successful experiences with) technology, they would develop positive attitudes toward computer use which, in turn, reinforces their intention to use technology over time.

Although perceived usefulness and attitudes towards computer use directly influenced intention to use technology, the former constructs were affected by their antecedents (i.e., perceived ease of use, computer self-efficacy, subjective norm, and facilitating conditions). Perceived usefulness was significantly explained by perceived ease of use, computer self-efficacy, and subjective norm. On this basis, by creating an environment where it does not take much effort to use technology,

institutions would be fostering the development of computer self-efficacy among their students. At the same time, when educators and administrators model the use of technology through words and deeds, it would reflect the importance of technology integration within the institution. Furthermore, technical support and skills training on the core and advanced applications employed for teaching and learning should also be readily available. It is commonplace for institutions of higher learning to place provide web-based training to supplement their on-site courses with a view to allowing students to acquire ‘just-in-time’ knowledge and skills that suit their learning style and mode.

Because beliefs and attitudes do not remain static over time, educators and administrators in higher education need to remain responsive to the changes in technological advancements and how such changes could be optimized to enhance teaching and produce effective learners. Given the current research on digital natives in higher education (Gu et al. 2013; Teo 2013), it is fair to conclude that students expect to engage with a reasonable standard of technology for study and interaction at their place of learning. Such engagement would include access to the Internet, teaching and learning resources, and readily available user support anytime, anywhere (Margaryan et al. 2011).

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front of a class, talks, an

Lecturing is by far the most used didactic instrument in teaching students in higher education.

The purpose of this paper was to address some of the shortcomings of this pedagogy and to suggest ways to make them more effective.

Lectures seem to fall short in a number of ways: (a) lectures are poor at promoting critical thinking, (b) students attend lectures in limited numbers, and (c) while present engage themselves only to a limited extent, (d) students loose interest in the subject matter and display all kinds of off-task behaviors, (e) students tend to concentrate their learning activities based on the lecture notes rather than the more extensive book, (f) the idea that lectures can cover most subject-matter is false, and (g) the empirical literature on what students learn from lectures is limited. The most fundamental problem of lectures is that they tend to be based on the information transmission fallacy. This is the idea that what is taught by the teacher is remembered by the student. In reality however, students do not store information as taught. They store their interpretation of what is lectured. Memory is constructive and students have to do

something with what they learn in order to remember and use. Constructive activities that foster learning and remembering are: recalling and rephrasing what is learned in one's own words, writing an account of what is learned again in one's own words, discussing subject-matter with peers, presenting subject matter to others, etc. These constructive activities, aimed at improving memory and transfer, are the core of attempts to make lectures more effective. Our paper described various approaches of active learning in the classroom, that have four elements in common: (a) an initial individual learning attempt by students to master important concepts of ideas, (b) the presentation of a relevant problem by the teacher in the classroom setting, (c) elaborative activities of individual students or small groups of students to come up with solutions to the problem, and (d) feedback of the teacher. The available evidence suggests that these activities massively foster student learning. The reader may have deduced from the foregoing that we are of the opinion that conventional lectures have no use. This is a not entirely accurate deduction. We believe that books and other resources that can be studied at one's own pace in the taciturnity of the library or at home, generally do a better job in conveying content than a lecturer from his notes. In particular if the goal of learning is to recall information for later application and therefore requires detailed scrutiny by the learner, self-study is superior to listening and making notes.

Appendix 1:

List of reading assignments

- Joost Lowyck (2013). **Bridging Learning Theories and Technology-Enhanced Environments: A Critical Appraisal of Its History.** In J.M. Spector et al. (eds.), Handbook of Research on Educational Communications and Technology,(pp 3-20). Springer
- Martin Oliver (2013). **Fostering Relevant Research on Educational Communications and Technology.** In J.M. Spector et al. (eds.), Handbook of Research on Educational Communications and Technology, (pp. 909-918).

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