

## **The Learning Technologists Toolkit: An overview of digital pedagogies for 21<sup>st</sup> century teaching**

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This paper provides an overview of a variety of digital age pedagogies for the modern teacher. Furthermore it is an action research oriented paper as it argues for the widespread utilisation of these approaches. First of all a description of the various pedagogies is given and then a justification for their incorporation into existing teaching styles is outlined. Next a set of suggestions for how teachers can actually implement and fine-tune these approaches into their teaching is provided. This paper draws on my experiences using these pedagogies as well as the experiences and feedback of students learning via these approaches in ICU's Academic Reading and Writing, Advanced English Presentations, Research Writing, and other classes over the past 7 years. This paper therefore aims to highlight the ways in which current best practices in digital pedagogy could influence the adoption of these pedagogies more generally at ICU in the future.

ICU's English for Liberal Arts program (ELA) came into being in April 2012 after a long reform period. One of the aims of the current program is to prepare students not only for academic study at ICU, but also at some of the other universities worldwide that ICU students attend as part of the Study English Abroad (SEA) program, and the junior year abroad program. It aims to do this by motivating students:

The ELA is designed to promote maximum student engagement and interest, which make learning easier and more enjoyable. The ELA has small classes that emphasize group discussion and a lot of interaction with other students and teachers. The program is an important introduction to a liberal arts education, which, at ICU, takes place amid a stimulating learning environment. (International Christian University, n.d.)

This is a laudable aim, however to really engage and get the attention of digital native learners a modern set of pedagogies, and the appropriate learning technology apps and tools for these pedagogies, need to be adopted and implemented in a university wide way. At present these types of digital pedagogies are not present in the ELA in a widespread way as only some teachers are partially employing them, and even fewer teachers are using them to their full potential. So the ELA needs to institutionally adopt these more modern pedagogical practices to maximise student engagement, enjoyment and interest. This is especially important now that ICU has been chosen as one of the so-called Super Global Universities and aims to facilitate "Enhanced Learning Support Through ICT" (International Christian University, 2014) in the ELA and in the wider university.

## SAMR

To help choose appropriate software apps for courses a number of evaluative approaches are possible. One of the most respected is the SAMR model. This is a cognitive tool for evaluating the pedagogical usefulness of educational technology software as opposed to just cost saving evaluations. It was developed by Ruben Puentedura (Puentedura, 2013) and is used by many educational technology specialists, software developers and school and university technology implementation supervisors.

SAMR starts with the assumption that not all software tools are equally useful. At the lowest level of utility are the new software tools that merely replicate what other existing software does, or what is currently being done in an analogy fashion. These new applications offer few or no real advantages over current practices and tools and therefore there is no compelling reason to advocate their incorporation and usage into any learning technologist's toolkit or educational syllabus. An example of this would be merely changing one version of a desktop word processor for another on school or university computers, for example swapping out an older version of Microsoft Word for a newer version. In the SAMR model, this category is represented by the S for Substitution type tools.

Next on the list are those tools that extend the range of what is currently possible by offering marked improvements over existing apps or systems. Here depending on the productivity boost they bring, and the time needed to teach and incorporate them, they may be recommended for inclusion as they do offer a more efficient way of doing the same tasks. An example of this would be an upgrade from a student edition of Microsoft Office to a business or professional edition, as this would edition upgrade would offer more than a simple version update would offer. These make up the A for Augmentation type tools in the SAMR model.

The next level up the scale is for those new tools that are so powerful that they allow for the modification of the original tasks given to students, as these tools have the ability to do new things that were not possible before. An example here would be moving from Microsoft Word or any other desktop based word processor to Google Documents, as this move would enable full real time collaboration among students due to the paradigm shift on how data on documents are accessed and shared. In the SAMR model this is represented by M for Modification type tools.

The last item on the scale is for software tools that are so radically and profoundly different that they change how the syllabus is constructed, and how students work. An example here would be the full incorporation of Google Docs operability with all mobile phones and tablet devices as these would no longer tie the student to a computer, thereby enabling mobile learning to take place with all the myriad opportunities this opens up. In SAMR terms this is represented by the R for Redefinition, and is the ultimate learning outcome change.

Therefore when educational institutions are thinking of spending time and energy installing new software on their computers and training staff and students on the usage of this software it is effective and helpful in a time and motion study type way to run the proposed software through a SAMR check first. Currently ELA teaching staff do not have any software installation privileges at ICU as this is tightly controlled by the Integrated Learning Center staff, therefore teachers can only use the apps and tools already installed on ICU computers, and which are currently under utilised by the ELA. However there are options such as web-based tools like the Google Apps suite, which require no installation at all and many of which are free. Teachers do however have to spend time training their students (and

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sometime other interested teachers) how to use these web-based tools. So I personally run everything I am considering using through a SAMR check before adopting and piloting any new tools.

### **PLE**

Any new apps or tools that do make it through this initial and on-going SAMR check then get put in my Personal Learning Environment (PLE), not to be confused with Personal Learning Community (PLC) which is about a community of like minded learners (Lewis & Allan, 2004, p. 21). A PLE is a kind of digital toolkit and after I have played around with the tools and seen what they can and cannot do, if they are still useful to me and I think they will be useful for students in terms of the learning outcomes I envision for them, the students get taught these tools. Given the difference in ability, interests, and the educational levels operating in the ELA not all of my toolkit gets taught to all of my students, as each course content and duration limits what they need and can cover. For the ARW classes the full course description and learning outcomes are in the ELA Staff Handbook. However the relevant sections for the purpose of this paper are these:

12. Students should also be able to give a short, effective oral presentation with appropriate body language, gestures, voice skills, eye contact, and interaction skills. Of course, effective computer skills, such as Google Presentation, PowerPoint or Keynote will be a part of this outcome as will the ability to design slideshow based on current best practices in presentation and cognitive learning theories. LOI's for this will revolve around the quality of slideshows produced by students and the quality of their delivery of the actual presentation.

13. Students should also be digital and information literate to the extent that they can easily find, evaluate, organise, share and use sources of any type for academic purposes. and be able to keep this skills up to date as technology progresses. The LOI's for this are teacher evaluations of individual students range of sources in their essays, their Zotero collections of these sources and the quality of bibliographic work they produce using Zotero.(ARW 1 course syllabus)

So the tools chosen for the PLE for ARW students is done with these objectives and outcomes in mind, and with the limitations of the IT / ICT facilities at ICU. Therefore when choosing these tools I also wanted to select ones that offered a group function to emphasize the collaborative aspects of learning, so Google Apps and Zotero both featured prominently.

### **TPACK**

Overall all my courses utilize the Technological Pedagogical Content Knowledge (TPACK) approach (Marino, Sameshima, & Beecher, 2009; Mishra, Koehler, & Zhao, 2007). This is a framework for teachers that leverages advances in information technology / information communication technology (IT/ICT) developments in educational planning. This approach is now being used by more and more modern minded teachers as there is now a Facebook group, Twitter community, and a Mendeley research group, as well as a registration section on the official site (Koehler, n.d.).

In essence the TPACK philosophy argues that just as good pedagogy improves teaching by improving the delivery of content, good use of educational technology can and does

change the pedagogy as it makes possible things that very not possible is the recent past. Therefore by extension the content delivery is also improved. A good example of this is the advent of 'Flipped Learning' as this exemplifies exactly how the TPACK approach changes teaching.

### **Flipped Learning**

Flipped learning is a relatively modern blended learning pedagogical approach with roots in the older community of enquiry based model of education as envisioned by Dewey (Swan, Garrison, & Richardson, 2009, p. 3). However it has been gaining more traction in schools and universities recently, especially after the publication of its implementation into the curriculum by Eric Mazur, a physics professor at Harvard (Lambert, 2012).

The basic idea is to take the old passive style work, for example things like watching videos, reading books and other cognitive 'input' s but non creative activities that were normally done in class, and to 'flip' these tasks to students to be done as homework. At the same time the 'outputting' or active and creative style tasks i.e. things like writing assignments delivering presentations, designing slideshows, creating videos, problem solving and other dynamic type tasks that were traditionally given for homework, are 'flipped' the other way and brought into the classroom where they can be conducted under the teachers guidance.

An example of this in action could be the following. Imagine a class where the teacher had a VHS cassette with a documentary movie on it that the students had to watch. It would be impractical to try to make 20 or more (depending on the number of students in the class) copies of this VHS cassette onto other video cassettes to give to all the students so that they could watch it at home, and also the picture quality would deteriorate with the multiple copying of old style cassettes. So by default the teacher would make the students watch the video in class together. In addition the classrooms might not have comfortable desks and also the students might need to go to the toilet during the screening. These could disturb the whole class viewing if the teacher was continually pausing the movie and students were uncomfortable while watching. And if students go to the toilet without the screening being paused they would miss parts of the video. And some students could even fall asleep if the video is a long or boring one. So all in all, this example is a less than ideal situation for imparting knowledge via classroom video viewing.

Now imagine the teacher has a digital copy of this movie. This would be very easy to make as many VHS cassettes or DVD's can be copied (for educational purposes only) to a digital version by a wide variety of software applications, although I personally recommend Handbrake for the variety of file types it supports, and also because it is open-sourced software and therefore free. Whatever software is used though, the end result is the teacher then has a digital copy which can be uploaded onto Dropbox, Google Drive, Youtube, Vimeo, Microsoft SkyDrive, or any one of a number of online video file sharing systems. From there it can be disseminated to all the students fairly easily. The students could then be assigned to watch this video for homework in the comfort of their own home. This would mean that they were in a comfortable place and space (their home) while watching the video, and sitting on comfortable chairs, comfortable beanbags, lying in bed watching on a laptop or similarly relaxing while viewing. They could also pause the video whenever they liked without disturbing anyone else, they could even have pizza and drinks while watching, and generally be in a relaxed space and place while watching the video. However merely setting the

watching of long videos or reading for ‘flipped’ homework is also not the most efficient way as students can still get bored. Following the segmentation theory (Medina, 2011) of cognitive learning it is best to break the videos (or readings) into segments of less than 10 minutes with reflection questions set after each part and these are repeated in the follow on class discussions (see next paragraph). This is more stimulating and results have shown that memory retention improves when this is applied to presentations following Medina’s “repeat to remember, remember to repeat” concepts in his rules for memory 5 and 6 (Medina, n.d.; “Dr. Medina’s 12 brain rules & what they suggest about education today,” n.d.). This is more conducive for students getting the most out of the video, and thereby remembering and understanding more of the content.

The problem with this approach, assuming the teacher can use the technology to copy and disseminate the documentary (or readings) in the first place, is how to monitor whether the students are actually doing the ‘flipped’ homework regularly. Here there are a number of solutions to this conundrum. The first is the concept question. This is when the teacher asks a concept-checking question related to the ‘flipped’ work to the class at the beginning of the lesson (and building on the segmentation concept checking questions in the paragraph above) to see if students have understood the point of the video (or readings). The students answer by a show of hands (or holding up coloured cards in some cases), and depending on the majority of the answers the teacher can take corrective action with the whole class if necessary via group discussions as to why certain wrong answers were chosen, or just deal with individuals on a one to one basis if only a few answered incorrectly. Teachers can also pair up students with pairs consisting of students who answered differently so each member of the pair has to explain their choice. This is usually referred to as peer learning and has brought good results, not just in learning outcomes being achieved, but in increased motivation for doing the ‘flipped’ tasks as students do not want the embarrassment of not being able to perform in pairs with their peers, an embarrassment that would come if they could not answer due to not having done the ‘flipped’ work. This last factor is particularly relevant for my classes as Japan is one of the countries where it’s people put a large emphasis on saving face.

There is also a hi-tech version of this - the concept question i-clicker<sup>1</sup> that electronically monitors the numbers of respondents to the concept questions and also provides for a wider range of answers than just a simple yes or no binary type answer by show of hands or cards. However these digital systems are expensive and are not in use at ICU where I teach. Furthermore funding for this system would not have been authorised given the cut backs that are in force at ICU now. So I use blogs for reflections and answering of segmented concept checking questions for ‘flipped’ work.

### **Blog Journaling**

Many teachers in the ELA use a journal system of teaching. This usually involves students having to write a short (2 or 3 paragraphs) reflective entry in their notebook journals at least once a week on their classes. These are supposed to allow for deeper student introspection via extensive free writing on the materials covered in the classes. However these paper journals are usually only collected a few times a term with once a month being the average. So students sometimes forget to bring them on collection day, or else fill in all the entries the night before the collection day, or in some cases not do them at all and only the

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<sup>1</sup> <https://www1.iclicker.com/student-response-devices>

teacher would now. So either way there was little teachers could do about this. Even for students who did bring them in on time and completed in a regular and timely manner there were problems, as by the time teachers had read all the entries, commented on them, and returned them, some of the teachers' comments could be on students' journal entries written four or more weeks before, when by the time the journals are returned some students could have forgotten what they were thinking about in the journal anyway. The above all mirrored my experiences with the approach when I did it years ago.

As a result of these problems I looked to technology for a solution. So I started using online blog journals instead of paper-based journals to address this problem. This is the solution I opted for a many years back when I first started encountered the notebook journaling problems as I saw many benefits over paper journals by comparison. In my approach students have to post blog entries with their reactions to the 'flipped' readings or videos conducted at home, not just the class activities, and this has lessened the paper journaling problems.

First of all the blog entries are all automatically dated so teachers can easily see if students are doing their entries regularly or not, and so can take corrective action immediately compared with the journals, where such things only become apparent on collection day, and then only if the notebook entries are not done at all as teachers have no way to check dates in notebooks unless they collect them much more frequently as if students just do many paper entries the day before collection day the teachers have no way at all of knowing if this is the case. Secondly the blogs allow for the embedding of multimedia content into the posts, something paper journals obviously cannot do, and this richness of available content type for inclusion in blog posts frequently motivates students to be more creative in their posts as these are students who are digital natives according to Prensky (Prensky, 2001).

Thirdly by making the blogs public students realise they are writing for an audience of more than one, i.e. only their teachers. All blog url's from all students in class are shared via a common Google Group thread. From there students are taught how to set up an RSS feed reader (formerly this was Google Reader but after it was discontinued by Google I used Feedly) so they can monitor everyone else's blogs. This had another benefit besides creating an audience for the blogs. Students who were absent on any particular day could read the blog posts from the class and see what they missed. This benefit has been mentioned by students as being beneficial to them in their feedback over the years I have been conducting blog journaling and is an example of an emerging learning community (see the PLE section below). In this case this was a "Small Core of Active members – Closed Group" type of learning community (Lewis & Allan, 2004, p. 21) as the membership remains constant – the class members and myself. Each class had a Google Group set up with a discussion forum open to all. This also provided them with the ability to see each others email addresses and blog url's and this community spirit lead many of them to comment on each others blogs and conversations were taking place there as well as in the Google Group discussion forum.

### **Just in Time Teaching (JiTT)**

This is an approach that borrows from the business / management / manufacturing theory of just in time production made famous by Toyota in the 1990's ("Just-in-Time - Toyota Motor Corporation E," n.d.), where supplies are only ordered when needed to maximise efficiency and reduce costs. The educational variation on this is for teachers to give comments and feedback 'just in time' and when needed to maximise learning and memory

retention. The most well known college practioners and departments are again from the science field and the main JiTT homepage is on the Physics department website at Indianan Purdue University (“Just in Time Teaching,” n.d.). Their approach involves students taking short surveys on their laptops up to an hour before the classes / lectures begin. The results from these surveys are then immediately examined by teachers, and the lesson plan for the day set up accordingly to deal with any and all problems the survey has shown in terms of student understanding. Again results from this have been very promising, both in terms of achieving learning outcomes in the student body and in individual student satisfaction, as students who learned physics in the SCALE – UP (a JiTT Approach) format at a wide range of institutions demonstrated better problem-solving ability, conceptual understanding, and success in subsequent courses compared with students who had learned in traditional, passive formats (Handelsman et al., 2004, p. 522). So I attempted to replicate this approach as much as possible in my classes, given the educational technology limitations at ICU.

Furthermore ICU does have enough computers on campus for all students either. There are eight Windows computers rooms and one of the four Apple Macintosh rooms which can be used by teachers with their classes, and individual students do not have access to these rooms at all, and a further three Windows and three Apple Macintosh rooms (with 120 terminals in total) can only be used by students if not in use or not previously reserved by teachers for their classes. Furthermore these ‘available’ six rooms are closed at weekends and evenings, and only open Monday to Friday, 8.40 am to 8.15 pm and they are very busy at lunchtimes and mornings accordingly. The library does have a small number of individual terminals for students, but these have no save functions enabled, so students need USB drives to work on those beyond simple web surfing / library catalogue searches, and being in the library these are not suitable for multimedia work due to noise restrictions. So any multimedia type questions could not be guaranteed to be accessible by all students in a timely manner. All this leaves ICU without the educational technology infrastructure needed to run JiTT pre class surveys this way.

So a few years back I came up with an alternative method that used the Blog Journaling as the JiTT concept check equivalent. I had the students write their reflective blog journal entries not only on classroom work reflection, as other teachers were having students do in their notebook journals, but I also had them write reflective entries on the ‘flipped’ homework. So they were reacting to video and readings they covered at home with blog entries written afterwards, as long as the blog entries were completed before the next class. As I had all the student blog url’s added to my Feedly RSS reader (previously Google Reader until Google retired that app in 2013), this then gave me timely access to, in some cases, very detailed pre class feedback from students on the subject for discussion that day. In this way I was using the Blog Journal to replicate the more hi-tech JiTT pre class survey systems that were not suitable for ICU given the educational technology limitations on campus.

### **Expanded Classrooms**

These social aspects of the tools also enabled the students to contact each other and their teacher (me) at any time, and given the ubiquity of smart phones, mainly iPhones and Androids, they could be reasonably sure of a quick response. This is the Expanded Classroom (Shaw, 2013) where technology enables learning to take place everywhere, essentially making the wired (or wireless) world the classroom. As part of the reform of the ELA had cut the

classroom hours for the ARW stream 1 students ‘expanding the classroom’ seemed the obvious solution to this problem, especially when combined with problem based learning.

This learning anywhere / anytime approach was so successful that I maintained and expanded it and now not only do I have conversations with students on their blog posts they also have conversations with each other on their blogs and in the comments section of Google Documents and Slideshows in true asynchronous learning style as part of a community of learners (Lave & Wenger, 1991; Lewis & Allan, 2004).

### **Project Based Learning**

Project Based Learning (“Project-Based Learning,” n.d.) is an approach being used at many progressive schools around the world, but not really at many Japanese universities in the same way, at least to my knowledge. From the ELP to its ELA incarnation, ICU’s English department has had students take part in a winter project at the end of their freshmen year. So for stream 1 only having one semester instead of a year I had also set up project work for them. The traditional ICU project just involved three to four students researching a theme and working on a presentation slide show for that theme and doing a short (30 minutes) presentation.

For stream one, and building on the multimedia project based work I had already done in the ELP I set up a more ambitious project that would utilize what Apple calls 21<sup>st</sup> century learning skills (*Apple classrooms of tomorrow - today: Learning in the 21st century*, 2008) i.e. digital / multimedia skills, as well as most of the other tools from the students PLE’s. So in terms of tools the course fully utilized the Google Apps suite as well as covering reference management via Zotero and sharing of files via Dropbox. By the end of this course students were able to demonstrate their ability to find a range of good academic sources for their papers and presentations, and to store, organize, and share these with others in their project groups, and also reference these sources properly in their academic work at ICU. The projects also covered the basics of modern Presentations Theory covering such topics as slideshow design theories like PSE and CRAP (Duarte, 2008; Reynolds, 2008, 2009), and students used these theories in making their own project presentation slideshows.

Furthermore, the course also covered the creation of self-narrated video screencasts of students’ project presentations via QuickTime X, editing them via iMovie and uploading them via YouTube onto their Google Sites. These Google websites also hosted their essays and had a links page to show the depth of their research. Most of this iMovie work was done on ICU’s iMacs, The url’s of these final group project websites were then shared with everyone in the class for group constructive feedback purposes on each groups’ sites, and the final presentations were video recorded and copies given to the students for further reflection. Indeed one group of three students are took part in an educational technology conference<sup>2</sup> and did a presentation with me, explaining their experiences to the attendees on 1 February, 2014.

### **Conclusion**

So these are the overarching theories that underpin the work I do in my courses and classes in the ELA at ICU. In all my student feedback I have received very positive responses

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<sup>2</sup> <http://paperless2014.weebly.com/>

from students as they see the benefits of this approach. Also as ICU will be switching to a Google Apps For Education program from early 2015 many of the Google apps and tools will be available for teachers and students to use. They just need the pedagogies and skill sets necessary to do this to the full potential. Therefore as I have had great success with these digital pedagogies and the associated apps and tools, I fully advocate their incorporation into the ELA syllabus and urge their adoption in the ELA and wider ICU academic community.

## References

- Apple classrooms of tomorrow - today: Learning in the 21st century.* (2008). Retrieved from [http://ali.apple.com/acot2/global/files/ACOT2\\_Background.pdf](http://ali.apple.com/acot2/global/files/ACOT2_Background.pdf)
- Dr. Medina's 12 brain rules & what they suggest about education today. (n.d.). Retrieved from <http://www.wiredacademic.com/2011/12/dr-medinas-12-brain-rules-what-they-suggest-about-education-today/>
- Duarte, N. (2008). *slide:ology: The art and science of creating great presentations* (1st ed.). California: O'Reilly Media.
- Handelsman, J., Ebert-May, D., Beichner, R., Bruns, P., Chang, A., DeHaan, R., ... Tilghman, S. M. (2004). Scientific teaching. *Science*, 304(5670), 521–522.
- International Christian University. (2014, September 26). ICU Selected for Ministry of Education's Super Global University Project. Retrieved October 21, 2014, from <http://www.icu.ac.jp/en/news/20140926.html>
- International Christian University. (n.d.). The English for Liberal Arts Program [University website]. Retrieved October 20, 2014, from <http://www.technology-n-teaching.com/>
- Just in Time Teaching. (n.d.). Retrieved January 14, 2014, from <http://jittdl.physics.iupui.edu/jitt/>
- Just-in-Time - Toyota Motor Corporation E. (n.d.). Retrieved January 14, 2014, from [http://www.toyota-global.com/company/vision\\_philosophy/toyota\\_production\\_system/just-in-time.html](http://www.toyota-global.com/company/vision_philosophy/toyota_production_system/just-in-time.html)
- Koehler, M. (n.d.). TPACK.org. Retrieved October 21, 2014, from <http://www.tpack.org>
- Lambert, C. (2012). Twilight of the lecture. *Harvard Magazine, March-April 2012*. Retrieved from <http://harvardmagazine.com/2012/03/twilight-of-the-lecture>
- Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. Cambridge [England]; New York: Cambridge University Press.
- Lewis, D., & Allan, B. (2004). *Virtual learning communities - A guide for practioners*. New York: Open U.P.
- Marino, M. T., Sameshima, P., & Beecher, C. C. (2009). Enhancing TPACK with assistive technology. Retrieved May 13, 2010, from <http://www.citejournal.org/vol9/iss2/general/article1.cfm>
- Medina, J. (2011). *Brain rules: 12 principles for surviving and thriving at work, home and school*. Brunswick, Australia: Scribe Publications.
- Medina, J. (n.d.). Short-term memory. Retrieved January 14, 2014, from <http://brainrules.net/short-term-memory?scene=>
- Mishra, P., Koehler, M. J., & Zhao, Y. (2007). *Faculty development by design: integrating technology in higher education*. Charlotte, NC: IAP.
- Prensky, M. (2001). Digital natives, digital immigrants Part 1. *On the Horizon*, 9(5), 1–6.
- Project-Based Learning. (n.d.). Retrieved January 16, 2014, from <http://www.edutopia.org/project-based-learning>

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- Puentedura, R. R. (2013). Ruben R. Puentedura's Weblog. Retrieved August 30, 2013, from <http://www.hippasus.com/rrpweblog/>
- Reynolds, G. (2008). *Presentation zen: Simple ideas on presentation design and delivery* (1st ed.). Berkeley: New Riders Press.
- Reynolds, G. (2009). *Presentation zen: The video*. Berkeley: New Riders Press.
- Shaw, J. (2013, March 27). *The expanded classroom: The impact of technology in a connected world*. Retrieved from <http://www.slideshare.net/JonathanShaw2/cu-expanding-classroominted2013final>
- Swan, K., Garrison, D. R., & Richardson, J. (2009). A constructivist approach to online learning: The community of inquiry framework. *Information Technology and Constructivism in Higher Education: Progressive Learning Frameworks*, 43–57.