Incorporating Digital Technology in the General Education Classroom

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Abstract

A group of activities, using digital technology which supports learning and facilitates student academic success, were compiled in a 28-item challenge for beginning General Education students, as a part of a Life and Study Skills course. Each challenge invited students to access some aspect of digital technology which had the potential to increase their academic competence. A convenience sample of 29 male students, from three different classes, was used for the intervention. Students were all taught by the same instructor, in the same semester. The main objective of the study was to increase students' digital academic literacy, exposing them to applications and ICT skills which would increase their efficiency, self-efficacy and accuracy in executing academic tasks. The efficacy of the intervention was assessed by comparing students' work to others who did not take part in the study. The technology tools used were aimed at accomplishing tasks such as group formation and communication, note-taking, information capture, summarization, synchronous and asynchronous collaboration on tasks, referencing, formatting, grammar check, plagiarism and assessment. Students were challenged to complete particular tasks using specific applications. Students were given 28 days to complete the tasks, after which they were required to do two quizzes, using Kahoot!, as a group and Nearpod, individually. A screenshot of each completed activity was submitted as evidence of task completion. A questionnaire was used to garner student perspective on the intervention. Throughout the semester academic output were analyzed to see if students continued to use the technology introduced. The results of the study showed that students were appreciative of the technology introduced and had no problems learning how to use the different applications. Faculty observed that student output improved over previous semesters, where the intervention was not carried out. Some students nearing the end of their academic careers expressed regret at not being introduced to the technology earlier. The study illuminated the inhomogeneity inside classrooms with regards to academic digital technology. It also showed the benefit of introducing the technology during the General Education program, at the beginning of students' academic careers, and how this knowledge contributes to development of 21st century skills and workplace readiness of students. Plans are underway to introduce the technology to all students taking the Life and Study Skills course.

Key words: *Digital technology, Intervention, Kahoot, Academic Output, education program, Inhomogeneity.*

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Introduction

Prensky coined the terms digital natives and digital immigrants, to distinguish between those who grew up using mobile devices such as computers, smart phones and tablets, video games and the internet, digital natives, and those who acquired knowledge of these tools later in life, digital immigrants (Kennedy, Judd, Churchward, Gray, & Krause, 2008; Stoerger, 2009). Since then, there has been much debate on whether digital natives possess the technological savvy he suggests. Though it has been established that the current generation are prolific users of technology, especially in their personal lives (Oblinger & Oblinger, 2005; Stoerger, 2009), this does not represent the total picture of this generation. While there are those who have bought into Prensky's views on the higher performance of these students, and the need to adapt education to their particular learning needs (Oblinger & Oblinger, 2005; Prensky, 2005), there are still those who believe there is too much inhomogeneity inside classrooms to adopt a one-size-fits all pedagogy towards technology-driven pedagogic practices (Baytak, Tarman,& Ayas, 2011; Bennett, Maton, & Kervin, 2008; Yucel et al, 2010).

Nevertheless, there has been a flurry of activity surrounding the integration of technology for pedagogic purposes in higher education, in order to facilitate the learning needs of tech smart students (Kitchner, 2012; Patel, Chapman, Luo, Woodruff, & Arora, 2012) . Many educational institutions worldwide have incorporated the use of clickers and other student response systems, iPods, laptops, tablets and smart phones inside classrooms, to make sure they are not left behind as the Net Generation (Oblinger & Oblinger, 2005, Tarman, 2009; 2010) takes control of their own learning (Al-Wasy & Mahdi, 2016; Banister, 2010; Barak, Lipson, & Lerman, 2006; Liu, Navarrete, Maradiegue, & Wivagg, 2014). Yet despite the "awe" with which so-called digital immigrants view the technological capabilities of digital natives and the viewpoint that all digital pedagogy is high tech, many students view technology as merely tools which increase efficiency, enhance output quality, and reduce time on task (Oblinger & Oblinger, 2005; Stoerger, 2009). According to Kennedy et. al. (2008), high technology use by students does not even translate to increased preferences for technology-driven pedagogic instruction. Notwithstanding the use of technology for gaming and social media, it has been noted that the classroom is far from homogenous regarding the knowledge of technology by students. From observation, students are

not proficient with specialized technologies geared towards increasing and enhancing academic achievement and output.

We have observed that though our students intuitively use technology, they have not all been exposed to the wide range of tools at their disposal to enhance the quality of their academic output. This study forms a preliminary investigation of the impacts of introducing digital academic tools to students. It is hoped that such an introduction will ensure academic success and improve the quality of student work produced. In the project we examine the benefits of introducing academic technology to students early in their academic careers, when it can be of optimal use.

The tools were introduced at the beginning of a Life and Study Skills course for students in the first semester. A major aim of the Life and Study Skills course is to equip students entering the Bachelor's degree program with the skills necessary for a successful academic career. The course seeks to develop, in students, study and communication skills for critical thinking, problem solving, and creativity. These skills are not just focused on the transition into college life and the support of academic achievement, these tools lay the foundation for lifelong learning, personal success and recognize the implications for enhancing professional practice.

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Method

Background

The 28-day Tech Challenge is a four-week intensive course in essential technology and concepts, aimed at enhancing the digital academic literacy of students. Emphasis is placed on the four Cs of 21st Century Learning – Communication, Collaboration, Critical thinking and Creativity (Association, 2012). The challenge is strategically issued during the first month of the semester to equip students with the tools necessary for successful completion of the course, as they implement the technology during formative and summative assessment tasks. The Tech Challenge is a part of a Life and Study Skills course, taught by the General Education department.

The 28-day tech challenge fulfills the requirements of two of the six course learning objectives namely:

- Recognize the importance of time management, team work and effective study skills including basic research literacy and critical thinking

- Develop an understanding of the use of digital and information literacy skills for success at college and beyond

    Applications and sites introduced to students were chosen based on their usefulness in the following areas:

- Hosting of students support information - learning platforms
- Collaboration – synchronous and asynchronous
- Cloud computing
- Summarization and main idea selection tools
- Presentation efficiency
- Accuracy in academic report writing
- Note-taking and list making
- Research tools

The participants

The study used a convenience sample of N=29 male students in three different classes assigned to the same instructor, during the same semester. The course was taught in English and all students were Arabic English Language Learners (AELLs). The majority of the students were in the first semester (n=13) and the final semester (n=9). The course is designed for first semester students, however students may take it later if they had previously failed it, or failed to do it before, for whatever reason.

Study Design and Data Collection

An action research model was applied for the study, as the aim was to improve current practice by generating knowledge to empower both learners and instructors (Bradbury-Huang, 2010). The research sought to answer the following questions:

1. Do students value and appreciate being introduced to academic technology?
2. What are the impacts of the 28-day Tech challenge on students' time management, team work and study skills?

3. Does increasing the digital academic literacy of students improve the quality of student work?

The 28-day Tech challenge intervention was applied starting the first day of the first week of the semester. Students were given a 28-item checklist to work with for the 28 days of the challenge. In the first class the objectives and outline of the intervention were explained to students. Students were provided with a list of 8 apps to download on their smart device (Table 1). A basic subscription to these apps were free of cost, however one application, Grammarly, was paid for by the College. Students who registered late for the course, or did not attend some classes were not given extra time to complete the challenge and were required to catch up on their own or with the aid of colleagues. All information related to applications and websites were stored on the Edmodo site and was accessible to all students. Students were required to upload a grid with screenshots of completed exercises as evidence of task completion. A comprehensive set of power point slides incorporating all required information was supplied to students as extra reading. At the end of the 28 days all students were assessed formatively as a group using a Kahoot! quiz. Students were later tested individually using Nearpod. Both Kahoot! and Nearpod are student response systems used for student assessment. In order to gain learner feedback on the activity students were asked to complete a 14-item questionnaire, aimed at collecting student perception of the challenge. Kwiksurveys was the survey tool used to garner student feedback.

Table 1. *List of applications students downloaded on the first day of class*

Application	Use
Edmodo	Course delivery platform
Box	Cloud Computing
Mindmup	Creating mind maps for organization, main idea selection and summarization
Grammarly	Grammar, style and plagiarism checker

grammarly	
Citethisforme	Instant referencing
Cite This For Me	
PowerPoint	
PowerPoint	Presentation
Evernote Clipper	
	Clips articles and images and annotates them
Evernote	
	Notebook, notes and research clippings
Genius Scanner	
	Uploads handwritten notes
Wunderlist	
	Organizes your "to do" list

Table 2. *28-item Checklist*

Name …………………..	
ID ………………………	

	What are the 4 Cs of "21st Century" skills?
1	

2 Are you a trouble-shooter?

3 Why do teachers and successful students love *Cloud Computing*?

4 What is the main difference between Box.com and BBLearn?

5 Have you joined your class and team WhatsApp groups?

Do you always check what you have to do if you have missed a class?

6 Have you downloaded Wunderlist, Edmodo, Evernote, Box, and Genius Scanner onto your phone and laptop? Show me.

7 Have all your members of your small Edmodo study group uploaded a *recent* photograph

8 Have you reviewed this slide show to make sure that your team avoids making bad presentations?

How many bullet points should there be on each slide?

9 Do you know the eight items of information that you need on your first PowerPoint slide or report?

10 How many different types of shared docs does Google have?
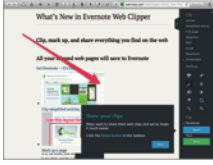
Do you know how to make a shared doc for your group?

11 Have you checked that each member in your team can edit your documents synchronously – can you all work on it at the same time even if you are in Bani Yas or Dubai?

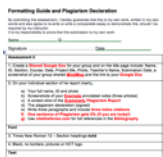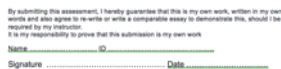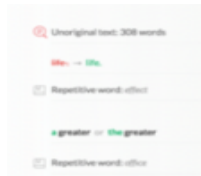|	
12	Have you created a notebook in Evernote named "My Research" and saved at least three articles in it?
13	Have you used Evernote web-clipper to take screenshots and used the web-clipper icons to highlight and annotate your research notes?
14	Have you downloaded the Premium version of Grammarly using your HCT email? HCT pays for it! What does Grammarly do?
15	Is your Grammarly plagiarism checker turned on? What does "unoriginal text: 308 words" mean?
16	Have you familiarized yourself with https://www.citethisforme.com for instant referencing? What referencing style must you use?
17	Have you reviewed this video to make sure that you completely understand paraphrasing? What is an inline citation?
18	Can you create a shared professional looking mind-map? What can you attach to it?
19	Do you completely understand the "Formatting Guide"? What font must you use?
20	Do you really understand the plagiarism declaration? Why might your teacher make you write another essay in front of her?
21	If your Grammarly Plagiarism Report says **"100% unoriginal text"** and you submit it, expect…..

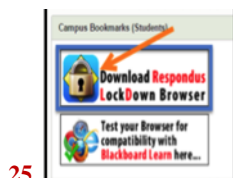|	
22	How many extensions do you have on your tool bar? What essential one is not in this image? G………………
23	Are you sure that you know how to submit assignments on BBLearn and Edmodo? How much do you lose if you miss the deadline?
24	Have you downloaded Genius Scanner onto your phone for uploading handwritten notes and scans? To where can you send them?
25	Have you downloaded the latest version of the lock down browser? Why do you need it?
26	Is your College email working? What must you put in the subject box when you write to your teacher?
27	Do you know where to find your Degree Audit? Who is your advisor?
28	"Eat that frog!" What does it mean?
Score	**How many items did you know on Day 1? …..…./28** **How many items did you know on Day 28? …….**/28 **How many items have you learnt? ………..**

Table 3. *Results of questionnaire garnering student feedback*

Question	Selected Response % (n)				N
Which semester are you in?	**Sem 1**	**Sem 2**	**Sem 3**	**Sem 4**	**29**
	45 (13)	14 (4)	10 (3)	31 (9)	
	Week 1	**Week 2**	**Week 3**	**Week 4**	**29**

When did you start the Life and Study Skills course?	45 (13)	38 (11)	14 (4)	3 (1)		
On the first day of the course how many items on the Tech checklist did you know?	**0-5**	**6-10**	**11-15**	**16-20**	**>20**	**28**
	36 (10)	32 (9)	11 (3)	21 (6)	0 (0)	
When did you complete and upload your 16-screenshot grid as evidence of your app use?	**Week 1**	**Week 2**	**Week 3**	**Week 4**		**26**
	0 (0)	4 (1)	23 (6)	73 (19)		
After doing the 28-day challenge, how many items do you now know?	**0-5** 0 (0)	**6-10** 7 (2)	**11-15** 18 (5)	**16-20** 14 (4)	**>20** 61 (17)	**28**
How many new items did you learn?	**0-5**	**6-10**	**11-15**	**16-20**	**>20**	**28**
	11 (3)	14 (4)	14 (4)	18 (5)	43 (12)	
On day 1, on a scale of 1-10, how would you rate yourself?	**1-2**	**3-4**	**5-6**	**7-8**	**9-10**	**27**
	18 (5)	30 (8)	22 (6)	26 (7)	4 (1)	
On completing the 28-day Tech challenge, on a scale of 1-10 how would you rate yourself?	**1-2**	**3-4**	**5-6**	**7-8**	**9-10**	**28**
	0 (0)	4 (1)	11 (3)	43 (12)	43 (12)	
How was the 28-day Tech challenge for you?	**Easy**	**So, so**	**Difficult**	**Very difficult**	**I don't know**	**29**
	28 (8)	59 (17)	14 (4)	0 (0)	0 (0)	
Which way did you learn the most?	**Listening to the teacher**		**Studying the power points alone**	**Discovering and using the apps together with my team**		**29**
	48 (14)		7 (2)	45 (13)		
If a student starts the course late, do you think it is possible for him to catch up if he studies the slides for 6 hrs?	**Yes**		**No**			**28**
	79 (22)		21 (6)			
Do you think the slides are easy to understand even if a student has a low level of English?	**Yes**		**No**			**29**
	79 (23)		21 (6)			
Are apps useful for student?	**Not useful**	**Useful**	**Very Useful**	**Essential if you are going to be a successful 21st century student**		**29**
	0 (0)	38 (11)	28 (8)	34 (10)		

Findings

The study, though preliminary, endeavored to find the answers to the following questions:

1. Do students value and appreciate being introduced to academic technology?

2. What are the impacts of the 28-day Tech challenge on students' time management, team work and study skills?

3. Does increasing the digital academic literacy of students improve the quality of student work?

The answers to these questions were explored through student and faculty feedback from questionnaires, Nearpod, Black Board Learn (BBLearn), Kahoot!, observations and feedback from faculty teaching the same students subsequent to the Life and Study Skills module.

BBlearn was used to capture whether students had completed the assignments of the challenge. A screenshot of evidence of use of each application or technology tool was required from each student to show he was exposed to the technology. This evidence was reviewed by the class teacher. Students then completed a Kahoot quiz together and provided written feedback using Nearpod. Though students were not required to complete a formal assessment on the technology, throughout the semester the class instructor encouraged the use of and looked for evidence of students applying their new found knowledge.

Feedback from questionnaire to gather student perspective

Table 2 illustrates the results of the questionnaire aimed at gathering the students' perspective of the exercise. At the start of the semester 68% of the students were familiar with 10 or less items on the 28-item checklist. None of the students were familiar with more than 20. These results provide evidence of the observed inhomogeneity and technological diversity of the class, regarding use of digital technology useful in academia, and challenge assumptions that students come to the classroom with uniform digital competencies, because they belong to the group of millennials.

After the 28-item challenge was completed 61% of students reported a knowledge of more than 20 items on the checklist, 75% learned more than 10 items previously unknown to them. When asked how challenging they perceived the exercise, 87% described the challenge as easy or so-so, which indicates that students are comfortable using technology, possessing core basic skills, but need to be introduced to specialized technologies such as those relevant to academia.

45% of students discovered the new technology through interactions with peers and 48% from listening to the instructor. This illustrated the ease with which students gained skills in the technology introduced.

Considering the ease with which students view the use of technology, their knowledge of basic skills and their view that it is convenient and timesaving, it was unsurprising that 100% of students thought the digital technology introduced to them were useful for their academic careers. Some students went further to give unsolicited comments on how useful they found the exercise and

some expressed regret on not being introduced to some of the technology on first entrance to the institution.

Select students' comments on the 28-day Challenge – using Nearpod

- *The challenge that will help you during your career life. It's not a temp. challenge*
- *The challenge taught me a lot of apps and websites that helped in my studies and time management*
- *It's never late to start this challenge. We all started from zero and ended up as heroes*
- *I think that the 28 days challenge helped me learn using many apps that at first I thought were too much and so complicated*
- *I'm using the challenge tips in my daily routine because the challenge helped me a lot.*
- *I don't prefer to use apps when studying but the 28 days challenge made me realize that some apps could be very useful when studying*
- *Manage your time and don't leave everything to tomorrow.*
- *At first I felt very bad, but now I think very useful*

Quality of student output – teacher observation

The aims of the study were to determine whether introducing students to academic digital technology would increase the output quality of students and impact their time management, team work and study skills. Compared to untreated classes, students' exposed to the technology gave more organized and better formatted work. The teacher (Frances) reported on the improved quality of work, compared to untreated classes. There were relatively few errors, if any, in the APA format of references and students submitted their assignments readily without prompting, which seemed to be a direct result of the assistance of the relevant technology.

Throughout the course of the module, it was observed that students utilized the applications introduced in their presentations, written work and as organization and time management tools. Students took pleasure in their increased efficiency and frequently commented on it. Their team work was evident based on much fewer complaints about not being able to work with or get in touch with other group members. Students were also observed using tools such as the google suite to work in groups.

Faculty Comments on teaching students in modules subsequent to the challenge

Students who have been exposed to the 28-day challenge show greater self-efficacy in subsequent modules. Report from faculty, who taught some of the same students in subsequent modules, indicated these students were better at citing references, main idea selection and organization using mind maps and other applications, and were more ready to take on tasks that required using the help of technology. They were also better at research because they had greater self-efficacy towards tasks. Students seem more empowered and were better at self-regulation than other students.

Discussion, Conclusion and Implications

The results from our preliminary study confirm that there are different levels of exposure to digital academic tools shown by students. The study revealed that learning new technology is intuitive for students and unnecessary for teachers to teach their use, once the students have been exposed to the technology. There is a definite need for students to be introduced to digital tools that can assist their academic output and help them to work more efficiently. Even tools which are familiar in their personal lives can be adopted for academic use, though sometimes this needs to be pointed out to students.

The quality of students' output, time management, and teamwork and study skills showed marked improvement, throughout the semester and in subsequent modules, for students who had been exposed to academic digital technology. Although not corroborated by quantitative data, a positive improvement was noticed within the department when treated students were compared with untreated students. The results are that academic digital technology is now being introduced formally to the curriculum of the module and will be implemented system wide across all colleges.

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