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# Transforming learning using iPods and Web 2.0 tools

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## Abstract

*In a world of rapid change and expansion of human knowledge, education must extend beyond a focus on basic competency in core subjects to include what have been termed the 4Cs (critical thinking and problem solving, communication, collaboration, and creativity and innovation) (Partnership for 21st Century Skills, 2011). As school curriculums change, so too must the tools used by learners and teachers and Information and Communication Technologies (ICT) will likely play a major role in such changes. The study on which this paper is based is planned as a five-year longitudinal investigation of learners' and teachers' perspectives about how best to use new technologies to facilitate student learning with an emphasis on the development of the 4Cs. This paper reports on activity from the first year of the study in which each student entering a regional Queensland secondary school was provided with an iPod Touch, capable of connecting to the school WiFi network, and with minimal restrictions on their access to Web 2.0 tools. Students have 24/7 access to the digital devices for use at school and home across the curriculum. This paper suggests a theoretical model for creativity in education contexts, which the study is developing, in order to determine the impact of the iPods on student creativity.*

## Background

In Australia, the *Digital Education Revolution* (DER), with funding of more than \$2 billion, is a major policy component of the Australian Government's Education policy. Its aim is to provide Australian students with a world-class education system that is underpinned by the effective use of Information and Communication Technologies (ICT). ICT are critical facilitators of student learning in the 21<sup>st</sup> century but there is limited understanding regarding how students use ICT for learning, as well as the relationships among ICT use, self-perceptions, approaches to learning, and student learning outcomes. This limited understanding is especially evident in relation to higher order thinking (HOT) and creativity. Further, as a result of the high uptake of mobile technologies both in schools and in the population generally, students have access to the internet and Web 2.0 tools both at school and at home, facilitating "any time, any place, any pace" learning (Johnston, 2004). Students spend more time out of school than at school each day, and the affordances and constraints of learning with mobile digital tools outside of school have not been determined.

The importance of this enhanced provision of ICT access for students is reflected strongly in the OECD's Programme for International Student Assessment (PISA), which includes questions about student access to, and use of, computers both at school and at home and their attitudes towards them (OECD, 2007). The 2006 PISA study reported that 96% of Australian students indicated they had a computer for school use, and 91% had access to the Internet at home (OECD, 2007). However, when *frequency* of computer use was questioned, only 23% of students reported that they used a computer at school 'almost every day' but 74% reported that they used a computer at home 'almost every day' (OECD, 2007).

While it is generally agreed that ICT have the potential to *transform* learning and teaching, further research is required to more fully understand the impact that ICT are having on learning and teaching in Australia. This research is pivotal to inform and monitor future strategic decision making (Cuttance & Stokes, 2000; Jamieson-Proctor, Watson and Finger, 2003; Jamieson-Proctor & Finger, 2007). In the

school context ICT was noted as an integral part of learning for fewer than 1 in 4 Australian students on a daily basis (OECD, 2007). Several studies have investigated the impact of ICT on learning at school from a teacher's perspective (Jamieson-Proctor, Burnett, Finger & Watson, 2006; Jamieson-Proctor & Finger, 2006, 2007), but there have been no major studies conducted in Australia, and very few internationally, to investigate how students are using ICT for learning purposes when not at school. Specific research is therefore required which investigates student use of devices in non-school contexts. This 5-year study aims to investigate across time, students' use of small mobile digital devices for learning both at school and at home and to compare students' and teachers' perspectives about how best to use mobile devices to facilitate student learning. This paper specifically reports on activity around one of the research questions from the broader study; namely, how do students use mobile digital devices to facilitate 21<sup>st</sup> century skills? 21<sup>st</sup> Century skills include critical thinking and problem solving, communication, collaboration, and creativity and innovation – the 4Cs (Partnership for 21st Century Skills, 2011) as well as student attitudes to their classroom environment and their academic and learning self-concepts.

This paper establishes the conceptual and methodological underpinnings of the five year study in relation to the 'creativity and innovation' component of the 4Cs and presents early data collected by applying the conceptual model for creativity in learning contexts developed for the study. The investigation of creativity in the study is based on the understanding that "creativity is a process that can be observed only at the intersection where individuals, domains, and fields interact" (Csikszentmihalyi, 1999, p. 314). An innovative systems perspective on student creativity is being developed for use in this research that defines student creativity as a process at the intersection where content (subject specific knowledge and processes), student (cognitive and dispositional characteristics) and context (physical and human) intersect and interact.

## **Conceptual Framework**

While there has been an ongoing push for many years to bring ICT into classrooms, until recently little attention has been given to how their impact might be measured (Jamieson-Proctor, Watson, Finger, Grimbeek, & Burnett, 2007). Further, educational technology research has often been criticised for being atheoretical (Mishra & Koehler, 2006). The lack of a generalisable theoretical framework not only constrains the use of ICT in education, but also severely limits the scope of research projects which might provide direction and meaning for educational applications of ICT.

In parallel with the increased attention that ICT has received in global education initiatives, the 4Cs are considered by many educators as essential knowledge and skills for every child to ensure they are prepared for the rigours of higher education, career challenges and a globally competitive workforce in the 21<sup>st</sup> century (Partnership for 21st Century Skills, 2011). The Partnership for 21<sup>st</sup> Century Skills (P21), an initiative of the US Department of Education, has created a conceptual framework (Figure 1) for 21<sup>st</sup> century learning.

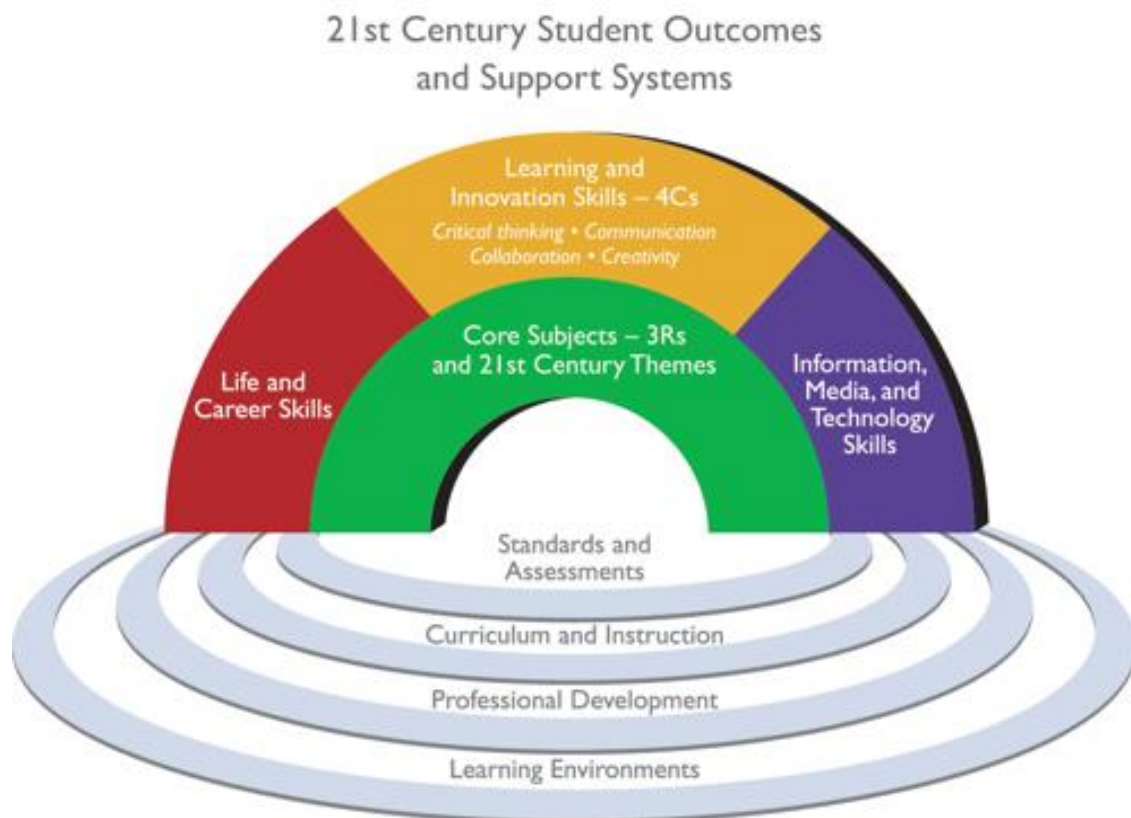


Figure 1. Framework for 21<sup>st</sup> Century Learning

The framework arguably presents a systems perspective on 21<sup>st</sup> century teaching and learning that combines a focus on 21<sup>st</sup> century *student outcomes* (depicted by the arches) integrating a combination of specific skills, content knowledge, expertise and literacies, with innovative *support structures* (depicted by the radiating bands under the arches) to help students master the multi-dimensional abilities required of them in the 21<sup>st</sup> century. The focus of this longitudinal research project is the 4Cs component of the framework (indicated in orange at the top of the arch) and the possible transformative role ICT might play in attaining these learning and innovation skills.

In the latter part of the 20<sup>th</sup> century, researchers proposed various systems perspectives for the study of creativity (Csikszentmihalyi, 1999). Such systems perspectives, or confluence approaches to the study of creativity, are based on the hypothesis that multiple components must converge for creativity to occur (Amabile, 1996; Csikszentmihalyi, 1996; Gardner, 1993; Sternberg, 1996; Sternberg & Lubert, 1996). Csikszentmihalyi (1996) for example, highlights the interaction of the *individual*, the *domain*, and *field* as necessary to produce novel solutions. He argues that an individual draws on information in a specific domain or symbol system and transforms or extends this information through personal cognitive processes, personality traits, and motivation. The field consists of influential individuals within a domain or context who evaluate and select novel ideas which they view as worthy extensions of the domain and which should be preserved and transmitted to other individuals, now and into the future.

As indicated earlier, an aim of this longitudinal study is investigating the impact that 24/7 access to handheld digital devices like iPods has on student creativity and innovation in various learning contexts. Immediately this aim suggests the need for a confluence approach to the study of creativity in different domains (curriculum areas), different contexts (in schools and outside schools) with the introduction of the iPods and related software tools (portable cognitive resources). A conceptual model for creativity that differentiates between important cognitive, dispositional and behavioural characteristics of the individual, and which illustrates the interplay between these characteristics and the domain within

which they are brought to bear by the individual, as well as the context in which the individual is operating, is therefore required. Figure 2 depicts the conceptual model that has been developed to underpin our thinking and to guide selection of appropriate research methods in relation to creativity in this study. The conceptual model is not static as it represents a relational system where a change to one part of the system affects the other parts. It illustrates the interrelationship between the three major components with their specific creativity variables that are under investigation in this study (Individual, Domain and Context). Further, the model will, as an anticipated contribution of this research, evolve as the overall research progresses and our understanding of the impact of mobile digital devices (iPods) on creativity is developed.

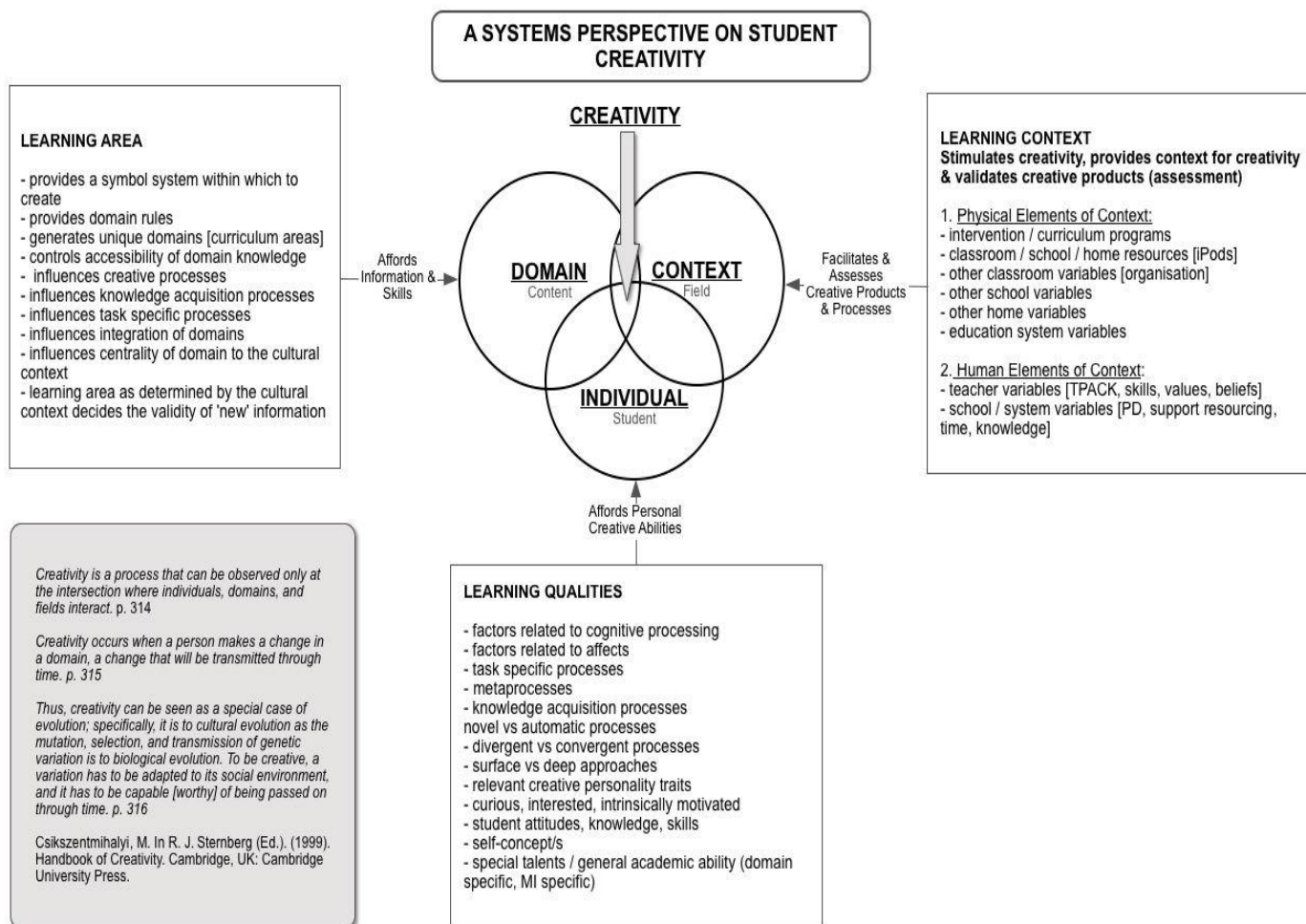


Figure 2. A Systems Perspective for Student Creativity

The model endeavours to identify the main dependent variables in each of the three major components (Individual, Domain and Context) that are predicted to impact on school student creativity. These variables have been gleaned from the accumulated literature on creativity and are specific to learning contexts where students operate within, and manipulate the symbol system of a particular domain, all within a describable/observable learning context. Further, the model recognises that the students bring to bear their individual learner qualities to each learning task in order to create an innovative response that is validated by others (teachers, peers, parents/caregivers) who are also part of the context (field), most often through an assessment process. Once the variables that constitute the three major components were identified, the model was adapted to be used as an observation tool. Each of the three variable clusters (Learning Area, Learning Qualities, and Learning Context) were expanded by turning each into a series of questions to be used initially for classroom observations of lessons where

students were expected to use their iPods or other digital technologies. As the focus of the study is on the impact of ICT to facilitate the development of the 4Cs, it was necessary to identify and observe students who were (a) using their iPods and other digital technologies (laptops, desktops, wifi, iPads etc) and (b) were engaging in the learning activities provided by the teacher in an interesting or novel way. An initial observation protocol was developed from the model and a section of it is depicted in Figure 3.

<b>Creativity Model Component</b>	<b>Indicative Observation points</b>	<b>Observation comments</b>
<b>Domain/ Content</b>	What subject area (domain) is the focus of the lesson?  What have students been asked to do? What specifically is the task?  Is the focus knowledge acquisition or HOT? (i.e., Bloom)  How are they using the iPods/ICT to help them get the job done?	
<b>Context</b>	Are the students mostly working individually or in small groups or as a whole class?  What physical resources do they have besides iPods/ICT?  What other helpers/adults if any are present?  Are the students specifically told how or when to use their iPods/ICT resources?  How is the students' work to be assessed?	
<b>Individual</b>	Identify 1-2 interesting students, describe <u>how</u> they are performing the required task. What are they doing, –in particular, with the available ICT?  What specific personal characteristics can you observe being used/happening?  Is the class generally managing to complete the required task? Any problems? Why?	

*Figure 3. Classroom observation protocol developed from the Systems Perspective for Student Creativity*

Both the conceptual model for creativity, and the observation protocol, will be modified as new and possibly unexpected variables are identified. The qualitative data gathered from the protocol when students are observed using iPods/ICT for learning is being transcribed and analysed using Leximancer 3. Leximancer identifies the salient dimensions of discourse by analysing the frequency of use of terms and the spatial proximity between those terms. It uses a grounded theory approach to identify major themes within the comments. At this early stage it is not appropriate to report fully on these data. However, enough work has been done with the observation protocol in the first year of the research project for the researchers to determine that it is a useful tool with which to gather classroom

observations. Further, the initial data collected with the observation protocol suggests that it is useful in delineating between creative and non-creative iPod/ICT use by students within a specific domain and context. Future development of the model and protocol is aimed at further teasing out more precise ways of determining whether iPods/ICT are impacting students' creativity and HOT skills.

## How are the person, processes and products of creativity to be measured?

When attempting to understand creativity, researchers generally ask questions about the creative process, the creative person, and the creative product (Weisberg, 1993). Using the model in Figure 2 as a guide, two main research instruments are being utilised to gauge change across time with respect to student creativity. The first, the *Creativity Checklist* (CC) (Proctor & Burnett, 2004) is an instrument for teachers and researchers to record observations of students' **individual** dispositional and behavioural characteristics of creativity as displayed in the learning context of a classroom (See Appendix 1). The second is the observation protocol (Figure 3) developed from the creativity systems model depicted in Figure 2. The model has been modified to allow researchers to observe classroom activity (**creative processes**) and record notes as appropriate for each of the three major components of the model (Domain, Context and Individual) and their specific creativity resources (Figure 3). The **product** dimension of creativity will be based on the theoretical underpinnings of the componential conceptual model (Figure 2) and utilise a process of consensual assessment as described by Amabile (1996). The consensual assessment technique provides a general methodology that should produce clear and reliable judgements of creativity in education contexts. It is based on a conceptual definition of creativity that comprises two essential elements: A product will be judged as creative so long as it is (1) both novel and appropriate, useful, correct or valuable and (2) the initial task is heuristic rather than algorithmic. An algorithmic task is one for which the path to the solution is clear and straightforward, while a heuristic task does not have a clear and readily identifiable path to a solution. It becomes part of the problem solver's task to identify the path to the solution. Thus, this research project is developing a useful conceptual model of creativity that is a 'best guess' with respect to the variables that are necessary to articulate an operational definition of creativity in learning contexts. It identifies the characteristics appropriate to determine whether a person, product or process is creative. The model and the observation protocol developed from it will allow observers to make judgments about the variables described in each of the 3 core components (Individual, Domain and Context) and, as they surface, add new variables to the developing model. The Creativity Checklist will allow researchers and educators to make judgments about the individual variables contained in the model and a process of consensual assessment will determine the worth of the product that the students create in response to heuristic (authentic, rich tasks). Of particular interest to this project is the ways in which iPods/ICT may assist in the transition from novice towards expert in terms of creativity in a particular domain

## Methodology

The five year longitudinal study, upon which this largely exploratory paper is based, will develop and use a number of new measurement tools that are based on theoretical frameworks developed from the literature specifically for this research and which will themselves make a further contribution to the literature. The development of one such instrument, the *Systems Perspective on Creativity* framework, and its related observation protocol, has been described in this paper (Figures 2 & 3).

This study utilises a repeated measures, mixed-method design. The repeated measures aspect allows developmental differences across time to be assessed. Teachers will complete the *Creativity Checklist* (CC) (Proctor & Burnett, 2004) annually for each student in the cohort. The CC requires teachers to reflect upon the personal creativity characteristics displayed by each student as they participate in curriculum activities across the year and rate each student on a four-point Likert scale (Rarely, Sometimes, Often, Very Often) for the frequency that the student displays each of the characteristics described (Appendix 1). The CC has undergone an extensive evaluation process that refined and confirmed the instrument's psychometric and theoretical structure. The CC's single factor was reported to have a very high internal consistency and is considered a reliable measurement instrument for the personal dispositional creativity traits which it describes (Alpha Coeff.=.93) (Proctor & Burnett, 2004).

Students will also be observed at regular intervals while working on domain-specific tasks with their iPods and other ICT resources. These observations will be collected using the observation protocol described in this paper. The observations will be collated and analysed for major and recurring themes using Leximancer 3. The products of their creative endeavours will be assessed using a process of consensual assessment (Amabile, 1996) and it is envisaged that these assessments, along with their scores on the CC and the observations of the creative process will form a holistic picture of the impact of iPods/ICT on creativity.

## **Participants**

The study uses a convenience sample chosen because of the introduction of 24/7 access to iPods for all students in the cohort at a regional Queensland independent P-12 school. The participants in the part of the study reported here comprise one year level student cohort (N=39). When each student in the research cohort commenced Year 8 in 2010 they were provided with a WiFi-enabled iPod Touch, an email account, and an iTunes account to download apps from the Apple Online Store. The students were allowed access to the iPods 24/7 from June onward. The students were given ongoing instruction in 2010 and 2011 with respect to digital citizenship. The two Year 8 form teachers (responsible for teaching the students English/SOSE and Mathematics/Science respectively), and their students were the primary focus of the study in 2010.

## **Research Procedures**

The two Year 8 form teachers completed the CC for each student in October 2010 (T1) and it was completed again by their teachers in June 2011 (T2). The T1 and T2 checklist data were compared using a paired samples *t*-test with 31 complete matched student data sets from the original 39. Some students left the school and others came during the course of the first year of the study and where data could not be matched, it was ignored. Findings from this initial quantitative data will be compared with data collected in the second and subsequent years of the study and presented in future papers.

The students were observed by one member of the research team approximately eight times during the year while they were working on curriculum tasks, in various curriculum areas, and with both teachers. The lessons were either chosen at random for observation or were observed at the request of the class teacher who anticipated that the lesson would yield some interesting data on the use of iPods for learning in their curriculum area (domain). The protocol developed from the conceptual model for creativity displayed in Figures 2 and 3 was used as an observational tool. For the specific purposes of this exploratory paper, initial observations were collated and analysed to determine if the iPods were impacting upon the way students experienced the creative process; how they applied their personal creative characteristics; and the level to which their products were judged to be creative.

## **Sample of Initial Observations**

The classroom observations based on the creativity systems model depicted in Figure 2 yielded qualitative data concerning the three major components of the creativity model (Individual, Domain and Context) in each lesson that was observed. Table 1 displays the 3 major components with a sample of student and teacher comments illustrative of these individual components. Further data, as it is collected, will be analysed using Leximancer to determine sub-themes. Initial analysis suggests that the sub-themes of control, transformation, motivation, attitude and learning processes may become prominent.



Table 1  
Major components of the creativity model with sample observations

Component	Sample Observation / Comments
<p><b>Individual</b>  (Affords creative personal abilities and affects)</p>	<p>Marking rubrics are explored at start of each new project by Teacher. Teacher and students focus on how to achieve highest standards. Students use divergent thinking to develop plan for product. Students use special talents e.g., music/art to assist with team product.</p> <p>Students all have to complete same task for assessment – no variation for individual differences or abilities. Students follow instructions with limited divergent thinking required in most activities. Individual products required and no variability within products for different students. Subject specific content knowledge focus of lesson with limited focus on multiple intelligences and limited focus on processes.</p> <p>Students very social and enjoy working with peers but require direction on how to work effectively in groups/teams. Students are noisy with concentration difficult and limited reflection on project plan.</p> <p>Students enjoy using iPods and find them easy to use. Students use adjectives such as “awesome”, “fun” to describe using iPods. iPods are helpful and ability to research always available.</p> <p>Students comment that there are other ways to use digital tools than they are allowed. Students expressed a wish they were allowed to use iPods more and in ways that they want to. Students wished tasks were more “open” so they had choices. Product marking rubric developed by teacher with no consultation with students.</p>
<p><b>Domain / Content</b>  (Affords information and skills)</p>	<p>Students use iPods to complete English comprehension activities from a website. iPods used to make “boring” content like grammar, spelling and mathematics interesting. Students creating digital storybooks and illustrating own storybooks with pictures taken with iPods. Students creating movie to demonstrate how to light bunsen burner for other Year 8s.</p> <p>Students enjoy working with others but few opportunities provided as most tasks require individual products. For most parts of a lesson students sit at own desks working on individual tasks.</p> <p>Traditional processes still endorsed by teachers – understand task, research topic, mindmap solution, build / create solution. Students using iPods to support traditional tasks e.g., writing, researching. Mostly linguistic and mathematical intelligence domains stressed with limited use of creative domains (art, music). In addition, subject area knowledge is the focus of lessons. Drill and skill games used on iPod for literacy and numeracy. Prescribed knowledge, comprehension and application the focus of lesson with no synthesis (creativity) and evaluation obvious in a series of 6 lessons in one specific unit. Choice of products completely described by teachers with little to no variability allowed.</p> <p>Students say parents are questioning their use of iPods at home instead of doing “real schoolwork”. Hard to understand what teacher wants or why iPods are needed.</p>
<p><b>Field / Context</b></p>	<p>Students working in groups using the iPods to help each other. Consequently the classroom is characterised by busy noise and classroom movement.</p>

<p><b>(Facilitates and assesses creative products and processes)</b></p>	<p>Students instructed to delete apps if caught using an app that was not sanctioned in the lesson. Student says “it’s still school – wish I could use my iPod for music in class”. Students mostly working individually. Students not permitted to work on assignments at home in case parents help. Working totally done at school with limited opportunity to complete at home.</p> <p>Alignment between iPod use and all sections of the product development is limited e.g., students don’t plan, create and evaluate using iPods as the teachers favour traditional resources like paper and cardboard and paints. Teacher limits products that can be created and therefore processes that students use. Traditional content domains treated traditionally – stories, writing, maths problems.</p> <p>Teacher commences lesson with iPod activity to “hook” students but then moves onto more traditional tools – students lose interest and “play” with iPods. Teacher fully describes each activity and won’t permit iPods to be touched until students map out plan on books. Prior knowledge is surveyed using Poll Everywhere on IWB and iPods to respond.</p> <p>Teacher indicates an inability/lack of time to search for appropriate and motivating apps – very time consuming. Teacher expresses lack of knowledge about social networking tools that might be used in classroom.</p> <p>Organisational issues related to iPods being available and charged when required. Students without iPods could not complete set tasks.</p>
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### Creativity Checklist Results Year 1

The data from October 2010 (T1) and June 2011 (T2) were compared using a paired samples *t*-test (N=31). A non-significant difference was found between the two data collection times. This indicates that the students’ personal creativity traits, as a cohort, did not change in a statistically significant way during the first year of iPod access.

### Summary

The data presented above, in relation to the *t*-tests and the student and teacher comments is an initial attempt to validate the usefulness of the creativity model in understanding the impact of the iPods on the person, process and product dimensions of creativity. The impact will be summarised in relation to each of the three components of the model.

In relation to the **Individual** student component of the model, students expressed frustration that they knew ways of working with the iPods that they were not permitted to explore at school and due to the algorithmic nature of the tasks; they tended to explore the creative use of the iPods outside school more than at school. The teachers completed the CC from observations of the students at school and as the data indicate no significant change across the first year, it is acceptable to infer that the teachers did not record an increase in the creativity traits described by the instrument since the students were not provided with enough scope to display these traits.

In relation to **Domain**, the iPods were used across the curriculum, but as can be seen in Table 1, in directed tasks that aimed at enhancing the curriculum experience for students rather than transforming it in the majority of cases. Further, the tasks set represented a quite narrow interpretation of the subject domain and rarely integrated or allowed students scope to be innovative outside the confines of a carefully teacher-constructed task. Most tasks presented to the students were algorithmic as opposed to heuristic in nature and didn’t allow them to be innovative in the solution process.

In relation to **Context**, the use of the iPods was prescribed by the teachers for the most part and students

were limited in how they could use the iPods with respect to planning, synthesising and evaluating their solutions. Access to iPods was problematic when students left them at home or they were not charged for each lesson. This frustrated both the teachers and the students. Teacher knowledge of useful apps and ways of working with the iPods limited the use they planned to make of the iPods in the curriculum.

## Conclusion

This paper has established and explained the conceptual and methodological underpinnings of a five year study and presented some early data in relation to the research question dealing with the 'creativity and innovation' component of the four Cs (critical thinking and problem solving, communication, collaboration, and creativity and innovation). The investigation of creativity in this study was based on the understanding that creativity is a process and is observable at the intersection of individuals, domains and contexts (Csikszentmihalyi, 1999). An innovative systems perspective on student creativity was developed and used in this research. This systemic model defines student creativity as the interaction amongst content (subject specific knowledge and processes), student (cognitive and dispositional characteristics) and context (physical and human) variables. One of the specific intents of the longitudinal study, of which this paper reports on the initial establishment stage, is to determine how students use mobile digital devices to facilitate 21<sup>st</sup> century skills such as problem solving, higher order thinking and creativity. Although the primary intent of this paper was to establish the theoretical underpinning of the study in relation to creativity, initial findings suggest that teacher professional development with respect to both the model for creativity used to underpin this study, as well as ways to transform the curriculum with iPods in order to afford students the opportunity to engage in a creative process and demonstrate their creative traits will be needed, if mobile digital technologies are to have an observable impact on student creativity.

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## Appendix 1

### PERSONAL CREATIVITY CHARACTERISTICS CHECKLIST

(A teacher checklist for the observation of a student's personal characteristics of creativity as displayed in the classroom setting)

Student's Name (First and Last): \_\_\_\_\_

DOB: \_\_\_\_\_ Today's Date: \_\_\_\_\_

For each of the following characteristics, tick the box that most nearly represents how often, in your opinion, the student in question displays each characteristic. "Very Often" would indicate that when presented with a task, the student exhibits this trait at least 85% of the time. "Often" would indicate that the trait was exhibited about 50-85% of the time. "Sometimes" would be approximately 15-50% of the time and "Rarely" would be less than 15% of the time. Simply tick the box (Rarely, Sometimes, Often or Very Often) that best describes this particular student.

Creativity Characteristic and its Descriptors	Rarely	Some times	Often	Very Often
The student displays the characteristic of a...	1	2	3	4
<p><b>1. Fluent Thinker</b></p> <p>(e.g., the student:</p> <p>is full of ideas; finds different ways of doing things; answers questions fluently and readily; hypothesises easily; generally possesses high verbal fluency; can list, tell/retell, label &amp; compile easily; answers (fluently) questions such as How many? Why? What are the possible reasons for? Just suppose...?)</p>				
<p><b>2. Flexible Thinker</b></p> <p>(e.g., the student:</p> <p>can solve, change, adapt, modify, magnify, rearrange, reverse &amp; improve; is versatile and can cope with several ideas at once; is constructive and mentally builds and rebuilds; is sensitive to new ideas and flexible in approach to problems; can tolerate ambiguity.)</p>				
<p><b>3. Original Thinker</b></p> <p>(e.g., the student:</p> <p>can create, invent, make up, construct, substitute, combine, compose, improve &amp; design; is attracted by novelty, complexity, mystery; asks What if? questions.)</p>				
<p><b>4. Elaborative Thinker</b></p> <p>(e.g., the student:</p> <p>can enlarge, extend, exchange, replace &amp; modify; goes beyond assigned tasks; sees new possibilities in the familiar; embellishes stories/situations.)</p>				
<p><b>5. Intrinsically Motivated Learner</b></p> <p>(e.g., the student:</p> <p>often seeks out knowledge on a topic at own instigation; does a job well</p>				

for its own sake, not for rewards; appears to enjoy learning for learning's sake.)				
<p><b>6. Self-confident / Independent Learner</b></p> <p>(e.g., the student:</p> <p>dares to be different, make changes, stand alone, challenge traditions, make waves, bend rules, and make mistakes and possibly fail; appreciates “alone time” and often likes to work alone; doesn’t mind if others think he/she is a little different; enjoys telling others about own discoveries and inventions.)</p>				
<p><b>7. Curious Learner / Immerses self in topic</b></p> <p>(e.g., the student:</p> <p>tries to discover the unusual or find out more about a topic of interest; unable to rest until the work is complete; possesses a sense of wonder and intrigue; possesses a high energy level; is adventurous and engages in spontaneous action; can uncover, investigate, question, research, analyse, seek out &amp; ponder.)</p>				
<p><b>8. Risk Taker</b></p> <p>(e.g., the student:</p> <p>will challenge, criticise, judge, question, dispute &amp; decide; not afraid to try new things; not afraid to fail; can rank &amp; give reasons, justify &amp; defend, contrast &amp; compare, devise a plan, make a choice between.)</p>				
<p><b>9. Imaginative / Intuitive Thinker</b></p> <p>(e.g., the student:</p> <p>will fantasise, create, compose, invent, suppose, dramatise, design, dream, wish; is perceptive and sees relationships; can make mental leaps from one idea to another and from the known to the unknown.)</p>				
<p><b>10. Engages in Complex Tasks / Enjoys a Challenge</b></p> <p>(e.g., the student:</p> <p>can evaluate, generalise, abstract, reflect upon, move from concrete to abstract, move from general to specific, converge &amp; has problem tolerance; is not easily stressed; does not give up easily; can be irritated by the routine and obvious.)</p>				
<p><b>11. Sense of Humour / Fun / Lightheartedness</b></p> <p>(e.g., the student:</p> <p>enjoys “fooling around” with ideas and “playing” with possibilities; takes fresh and playful approaches to problems; often exhibits a light hearted approach to the creative process.)</p>				
<p><b>12. An Idealist / A Reflective Learner</b></p> <p>(e.g., the student:</p> <p>may ponder his/her role and goals in life; goes back over situations/solutions to problems to try and add understanding and</p>				

meaning; strives for deep rather than superficial understanding.)				
<p><b>13. Artistic Tendencies</b></p> <p>(e.g., the student:</p> <p>may display a considerable interest in and understanding of art, music, literature, theatre, concerts, construction and visual design and presentation; appreciates the novel, complex and mysterious.)</p>				