EDD 7914 – OL1 Curriculum Teaching and Technology
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Assignment #4 – Technology Integration – Paper
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Due: October 14, 2012
Submitted for Review: October 11, 2012

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Abstract

In this paper, the author describes using the Technology Integration Matrix (TIM) as a tool to evaluate his level of instructional technology integration. The TIM was developed to provide an objective way to assess the way that instructional technology is used in classroom practice and thereby give teachers and administrators a way to plan for improvement and professional development. In this case, the author has identified a target level of integration and outlined the key instructional technology tools that would be used. Based on the TIM, the focus of improvement is on giving students digital tools to allow them to plan and monitor their projects.

Technology Integration Matrix Paper

The Technology Integration Matrix (TIM) is an online evaluation tool designed to evaluate technology integration practiced by a teacher (Allsopp, Hohlfeld, & Kemker, 2007). The TIM was developed based on both research and best practice. In order to implement the National Educational Technology Standards (NETS-S; International Society for Technology in Education [ISTE], 2007), ISTE has suggested that a set of essential conditions must be met. One of those conditions is having teachers who are prepared to use technology appropriately. The TIM provides a rich assessment of the technology integration skills the teacher is demonstrating and facilitates planning to increase those skills leading to improved practices (Welsh, Harmes, &Winkelman, 2011).

Jonassen (n.d.) suggests that there are several elements of a constructivist learning environment that support technology integration (as cited in Allsopp et al., 2007). He identified eight such characteristics; however, in the TIM, these have been reduced to five categories: active, collaborative, constructive, authentic, and goal directed. Research based on the Apple Classrooms of Tomorrow findings (Sandholtz, Ringstaff, & Dwyer, 1997) suggests that there are five levels of skills that teachers go through as they progress from entry, through adoption, adaptation, and appropriation to invention. The TIM maintains the nomenclature of the first three levels but substitutes infusion and transformation for appropriation and invention, respectively.

By using the five characteristics of a technology-rich constructivist learning environment with the five levels of teacher skill progression, a matrix is created with 25 cells. Accessing the second version of the online matrix leads not only to definitions of each cell but a series of videos that demonstrate each learning environment characteristic at each of the five levels of

attainment in language arts, math, science and social studies. This provides a detailed, multi-media, and clear indication of what each cell represents.

Assessing Current Level of Technology Integration

In assessing the instructional technology integration level of the author, it is important to note the unique teaching context. The author is primarily an Information and Communications Technology (ICT) teacher in an international school. The curriculum to be followed is based on the Primary Years Programme (PYP) and Middle Years Programme (MYP) of the International Baccalaureate. The technology focus in the PYP is on developing skills in a range of areas (digital art, word processing, spreadsheets, online information retrieval, graphic organisers, control technology, and presentations) that would be used in projects that are integrated in the regular classroom curriculum. In the MYP, the focus moves to design technology areas such as control technology (robotics), 3D drawing (architecture), digital imaging, and programming. Finally, the author has time allotted to be a digital learning coach. All of this was considered while using the TIM.

The author, often in collaboration with other teachers, has worked on projects that gave students a good deal of choice, particularly as they get older. Projects are sometimes negotiated with students with fifth-grade students given a particularly wide remit within which to develop research projects. Access is not yet one-to-one, but laptops and desktops, interactive white boards, document cameras, scanners, iPods and iPads are all available. Students are often permitted to select which software they wish to use. For example, for 2D drawing, they can sketch with a pencil and scan, use the 2D drawing tool in GoogleDocs, or use software we have or they supply or find online. This suggests level five of the active range is being attained.

Collaboration has been a key development over the last couple years. Students regularly use GoogleDocs to collaborate in teams and use the survey tool to consult the opinions or practices of larger groups, in school, in Singapore, and beyond. They also use the chat function or Skype to consult each other when they are working at home. This suggests the fifth level of the collaborative range is being practiced.

Students use a range of tools to create presentations, models, and web sites, and to share their work with others. These include Prezi, Animoto, Google Sites, and YouTube (as well as PowerPoint and Keynote, if they supply a Mac computer). Some students have optionally podcasted some of their recordings or uploaded their SketchUp architectural drawings. This constructive environment is at the fifth level.

Several of their projects have included outside concerns. For example, the second of two middle school architectural projects required them to find a client for whom they would design a new built environment. Another set of projects related to environmental concerns, with students surveying classmates, parents, grandparents and others in Singapore and beyond on potential solutions and what respondents were prepared to do to reduce their carbon footprint. An important part of the PYP framework is action, by which students are encouraged to develop their own initiatives to solve problems or meet needs. These are authentic learning experiences.

However, there has been relatively little use of technology to plan, evaluate or monitor their work. They do use some subscription web sites, which give them some feedback. Mathletics provides feedback on their understanding of math concepts and the ability to complete basic arithmetic against two opponents who may be located anywhere in the world. TypingPal provides feedback on their keyboarding accuracy and speed. However, these and other examples are selected by teachers. Therefore, the author believes that cell E2 is the correct

level of technology integration attainment. This is indicated in light blue shading on Table 1 in the Appendix.

Target Setting

The author believes that a reasonable level to attain would be level E4. This is signified with green shading on Table 1. At this level, students are actively involved in setting goals, planning activities, and monitoring activities. They may use several technology tools in order to do this.

Given the current range of technology use, the author believes it possible to reach this level. Three of the four TIM videos in this cell were from middle school and focused on students selecting projects and creating online task lists. The one primary school video, however, one was from upper primary (grades 3-5) and used a digital planner. This is a good example of what could be achieved in the unit described below.

Literature Review

Students at the author's school have access to the Google Apps for Education suite and use the email, word processing, spreadsheet and survey tools widely. However, Adams (2008) noted that there are other tools that might be of use. One such tool is the calendar, which can be shared with other users. This permits teachers to show the schedule of assignments, benchmarks, and events. Students can create their own items in the calendar and thereby create targets for phases of their projects. Green (2010) described his university students who extended the use of Google Calendar in ways that he did not expect. In fact, it was a student who first created a group calendar for Green's course and shared it with classmates and instructors.

In addition to a calendar of events, the Google Calendar application facilitates the development of a task list. Surprisingly, the literature consulted under-played this function

(Adams, 2008; Green, 2010; Herrick, 2009). However, as the TIM video suggested, this is a potentially powerful tool. Students would be able to develop a project plan with calendar-based benchmarks.

In addition to using the calendar and task functions of Google Apps for Education, the literature suggests that graphic organisers can be a useful tool for planning work. Alber-Morgan, Hessler, and Konrad (2007) described the use of Kidspiration, a software package that makes creating concept maps easy, and help to organize their ideas visually. This should make it easier for students to plan their project and show relationships between ideas they read or develop.

Planned Intervention

Students in grade five already have a significant project that is envisioned as a capstone experience to signal the end of primary school. Within a very general theme, students, working in groups, establish the central idea of their project and the lines of inquiry. They conduct research on their topic with a view to creating a multi-media presentation. The presentation includes a booth with text, images and multi-media presentations on a computer. They make a formal presentation but also informally present their project to visitors to their booth.

Previously, to support this project, teachers created a hard copy exhibition guide. This booklet included templates for the central idea and inquiry points, a blank timeline, and assistance with planning. The intent of this intervention is to replace the exhibition booklet with a range of digital tools that students can use. They will be shown how to use the calendar and task tools that are part of their email accounts. They will also be re-introduced to the benefits of graphic organisers available in Kidspiration. Up to now, Kidspiration templates have been selected by the teacher. Part of the re-introduction will be to help students develop criteria to select their own. Students will also be instructed on the use of the survey tool in GoogleDocs.

The expectation is that there will be less paper used and more opportunity to share their work online with their team members, team mentor, and teacher.

Proposed Timeline

The proposed timeline must take into account that this is a team-taught learning experience. Some of the tasks will be distributed between the author, as ICT teacher, and the class teachers. The Exhibition unit begins in late February.

Starting after the October break, students will be introduced to the calendar and task tools in their email accounts and encouraged to use them. They will also be assigned a mini-assignment that uses Kidspiration. This will ensure that all students are familiar with its use and the templates that are available.

In January, the ICT teacher and the grade level team will confirm the range of tools necessary to replace the Exhibition booklet. Once these are settled, the ICT teacher will ensure that both teachers and students are adequately trained in their use. Once the unit begins, all teachers will support student use of these digital tools. At the end of the unit, the value of the intervention will be informally evaluated.

Conclusion

The use of digital tools that facilitates student planning, goal-setting, monitoring and, perhaps, evaluating, has the potential to develop a range of 21st century skills. They will need to be more independent in that they will need to select the appropriate tools and templates that will assist them in achieving the exhibition goals. They will use tools that increase collaboration among their team members. This infusion of technology will provide flexible and ubiquitous digital tools to support student learning and to develop independent learners.

References

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Appendix: Table 1 – Technology Integration Matrix

		1	2	3	4	5
	Technology Integration Matrix	**Entry** The teacher uses technology to deliver curriculum content to students.	**Adoption** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended	**Adaptation** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion** The teacher creates a learning environment that infuses the power of technology tools throughout the day across subject areas	**Transformation** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
A	**Active** Students are actively engaged in using technology as a tool rather than passively receiving information from the technology	**Indicator:** Students use technology for drill and practice and computer based training.	**Indicator:** Students begin to utilize technology tools to create products, for example using a word processor to create a report.	**Indicator:** Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	**Indicator:** Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the tasks at hand.	**Indicator:** Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library
B	**Collaborative** Students use technology tools to collaborate with others rather than working individually at all times.	**Indicator:** Students primarily work alone when using technology.	**Indicator:** Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	**Indicator:** Students have opportunities to select and modify technology tools to facilitate collaborative work.	**Indicator:** Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning.	**Indicator:** Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances
C	**Constructive** Students use technology tools to build understanding rather than simply receive information.	**Indicator:** Technology is used to deliver information to students.	**Indicator** Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	**Indicator:** Students have opportunities to select and modify technology tools to assist them in the construction of understanding.	**Indicator:** Students utilize technology to make connections and construct understanding across disciplines and throughout the day.	**Indicator:** Students use technology to construct, share, and publish knowledge to a worldwide audience.
D	**Authentic** Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments	**Indicator:** Students use technology to complete assigned activities that are generally unrelated to real-world problems.	**Indicator:** Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems.	**Indicator:** Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	**Indicator**: Students select appropriate technology tools to complete authentic tasks across disciplines.	**Indicator:** By means of technology tools, students participate in outside-of-school projects and problem-solving activities that have meaning for the students and the community
E	**Goal Directed** Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	**Indicator:** Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	**Indicator:** From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity.	**Indicator:** Students have opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	**Indicator:** Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum.	**Indicator:** Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

Current level of technology integration Target level of technology integration