Educational Technology Selection Scorecard

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**Introduction**

After 30 years as a key thinker in the use of technology in teaching and learning Tony Bates is still in the of position of stating “Given the importance of the topic, there is relatively little literature on how to choose appropriate media or technologies for teaching” (2015, p. 259). Assisting teaching staff to make good technological and pedagogical decisions in course design remains an imprecise science. The scorecard being presented aims to give teaching staff a first pass tool that will present the benefits and pitfalls of a set of applications that could be used in an educational environment.

Developing a scorecard for a very diverse list of technologies is problematic; other established measures tend to concentrate on a situation where more information about the course or the purpose of technology known. The Learning Object Review Instrument (LORI) has a very specific in its aim. A resource is judged against a set of criteria that relate to a specific course being taught. A criterion like ‘Learning Goal Alignment’ assesses the resources ability to meet the specific goals of a course. The SECTIONS media selection tools primary aim is assessing media content that will satisfy a course requirement (Bates, 2015, p. 260). Hodges and Clark (2011) developed a scoring mechanism for a specific technology; a Web 2.0 presentation tool. The scorecard for this paper does not have a specific course or even the goal a teacher would want to achieve. The categories, criteria and attributes of this scorecard have been informed by these existing evaluation systems, but due to the broadness of the tools and the unknown educational setting, have been adjusted to highly variable set of applications.

The list of example technologies is broad. The MOOC is a whole course; Canvas a platform to manage and present a course; Jing could be used by students or teachers; Mozilla Hello can link two students in a video conference. Through the scorecard development process a number of criteria were removed or adjusted, because they could not be applied to an unknown environment. The score card is therefore developed as a highly generic scorecard, where any user could complete the criteria and the result posted to a web location. This aim of this type of measure is to be an initial point in the selection of an application that would need to be further investigated. The scorecard does not attempt to incorporate the linking of learning outcomes to a specific technologies; this would be a secondary process that requires a separate evaluation of the application by the teaching staff.

In a first pass like this exercise there are a set of criteria that should be flags to a technologies use. If a technology is assessed as difficult for students to use, it would suggest the ‘learning alignment’ and ‘uniqueness’ would need to be quite high to consider using it. The attribute “Alignment with policy” assesses if an application is likely to breach an organizations internal policies, a low score would suggest it should not be used without significant investigation. In this case Canvas.net or Moodle could not be used without approval since most organizations would have an established and supported Learning Management System (LMS).

The scorecard approach is helpful tool for teaching staff starting a process to select an application for their course. The scorecard developed will never provide a definitive answer, and could potentially present issues if high scoring applications are used without further consideration.

**Applications included in scoring process**

Pinterest: Popular social bookmarking or curation tool.

IFTTT – If This Then That: An online application that applies programing methodology to link actions between online applications..

easel.ly : Online infographic development tool.

MOOC – edX: Online course delivery, primarily through delivery of materials without teaching interaction. For the scoring process edX has been treated as a system to present course materials.

Hopscotch: Application to teach concepts on programming, directed at upper primary students.

Jing – Free screen capture tool with voiceover that incorporates online sharing of the resultant video.

Hello – Mozilla: Very straightforward, one-to-one video conferencing system.

Conducttr: Social media based scenario development and delivery system.

Second Life: Virtual world where people s avatars can meet. The world can be built.

Canvas: Learning Management System, treated as a replacement LMS for organization.

Moodle: Learning Management System, treated as a replacement LMS for organization.

**Scorecard: Categories, criteria and attributes.**

The developed scorecard ranks applications in four categories; user experience, learning effectiveness, application properties and legal issues.

The scorecard uses a standard 5 point scale, and defined by attributes for each criterion. The five point scale is limiting because some criteria are less important than others. An initial version that included scales based on the criteria’s importance level did present more accurate overall scores, but made the understanding of individual attributes difficult, and would make the scorecard harder to complete for new users. Therefore the 5 point scale has been used for all items.

To make the scores more accurate for the intended audience the number of criteria in the ‘legal issues’ section was reduced so the other categories provide more numerical weight to the result. One criteria removed was the cost to students. Most applications did not have a cost and it was decided the criteria would be used in the ‘Aligns with policy’ criteria, on the assumption that any cost to students would be part of a course approval process.

**Category 1. User experience**

**Ease of use.** The tool needs to be well designed and easy to use for students and teachers. The attribute is based on Hodges& Clark (2011, p.43) definition which is clear and incorporates both teacher and student perspectives. “I am confident that I can use this tool and help my students use it.”

Scale 1-5. Not confident (1), Confident (5).

**Ease to teach with.** A application canbe well designed but a teacher may require a large investment of time and support teacher to develop a learning activity. Building on the the previous attribute the standard used is ; I am confident I can use this tool for teaching without support”.

Scale 1-5. Not confident (1), Confident (5).

**Technology requirements.** If students will not have access to the required technology, or it is difficult to install an application; support and access adjustments could be required in the course. The assumed base level of computing is assumed to be the ability to access and use the institutions LMS

Scale 1-5. A typical LMS user will not be able to use this program (1), LMS users will be able to use this application (5).

**Category 2. Learning effectiveness**

**Uniqueness.** Are there other applications that perform a similar task? The scale is included because if there are similar tools, they should be considered when choosing an application.

Scale 1-5. Many others with similar functionality (1), no others with similar functionality (5).

**Future use.** Where an application may be used in a person’s professional life after study, there is a benefit to them learning the application. This provides greater latitude to use a an application that is not as easy to learn or has other potential issues (Hodges & Repman, 2011, p. 2).

Scale 1-5. Not likely to be used (1), Very likely to be used (5).

**Motivates learners.** One potential benefit of online applications is motivating learners through online interaction, media delivery or gamification. The actual motivation will depend on the tasks being completed, but for this criteria are judged on the applications potential to interest students in their learning.

Scale 1-5. Not likely to motivate (1), very likely to motivate. (5).

**Interaction.** Interaction and collaboration arecore components Web 2.0 technologies. Does the application have elements that require or encourage students to interact with other students of their teacher? (Lomas., Burke,& Page, 2008, p. 10).

Scale 1-5. Does not require interaction (1), Requires interaction(5).

**Learning level.** This has been the most difficult criterion to score, since the application will only be effective is the learning activity being assigned. The applications are assessed on their most obvious use. The scoring for ‘learning level’ is taken Bloom’s taxonomy of learning as revised by David Krathwohl (2002).

Scale 1-5. Remembering, Understanding (1), Applying (2), Analyzing(3), Evaluating (4), Creating (5)

**Category 3. Application properties**

**Feature set.** There are many application that offer very similar main goals; Mozilla Hello at its base similar to Skype in it provides video conferencing, bit Skype offers multi-person conferences and screen sharing. Sometimes the simple application will do the task required, but may limit the ability of users to adjust and extent the activity. Does the application provide an extensive set of options?

Scale 1-5. Limited features (1), Extensive features (5).

**Outside the LMS.** Most universities will have an established LMS. Hodges & Repman (2011, pp.2-3) clearly state that many tools outside the LMS will have greater functionality because they are built for a specific purpose. Moving outside the LMS has some risks because institutional support will be less available. This criterion assess if the obvious use of a tool can be accomplished within common LMS systems.

Scale 1-5. Function can be replaced by LMS (1), functionality cannot be replicated in the LMS (5)

**Sustainability**. Online applications can disappear or be unavailable. For teaching staff to make a commitment to use an application they need to be confident it will be available when needed. Does the application have a wide user base? Does it have a business model that will keep it viable? These are hard questions to scale, since even some of the most successful companies (Apple and Google for example) remove applications. Is the application perceived to be a reliably available into the foreseeable future (5 years).

Scale 1-5. Unlikely to be available (1), likely to be available (5)

**Category 4**

**Cost.** The cost of an application can include purchasing, installing, maintaining and supporting an application. While all activities incur a cost (money, time or support), many online applications do not require payment of use, and could be investigated by a teacher without the need for a budget. The score for this scale assumes that an online application without support could be used in a learning activity.

Scale 1-5. Very high cost - over $10,000 (1), Moderate cost - equivalent of $150 textbook (3), no monetary cost (5)

**Privacy/data security. “**The old adage goes that if you’re not paying for a product, then by default you **are** the product (Kepes, 2013)”. While many of us are happy to agree to terms and conditions that we never read, requiring students to use an application requires a higher level of diligence. Is the data secure? Are terms and conditions reasonable? Is this an environment conducive to educational activity? This is one of the most subjective elements of the scorecard. “I am confident the provider will protect student privacy and provides a secure environment”

Scale 1-5. Not confident (1), Confident (5).

**Alignment with policy.** Each organization has a set of rules that apply to their organization, where an application breaches these rules it would need to be assessed before use. Does the application align with the policy positions taken by your organization?

Scale 1-5 .Doesn’t align with policy (1), may involve a cost to students (3) , aligns with policy(5)

Secondary scoring – even though included in the overall score an application that is scored ‘1, 2 or3’, is identified with a red background. Even if the application has an overall high score, it could not be used without the policy issue being addressed (this includes the issue of student cost)

**Technology scorecard – worked example**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **W2** | **W3** | **W4** | **W5** | **W6** | **W7** | **W7** | **W8** | **W8** | **W9** | **W9** |  | **For Interest- Average Score** |
|  |  | **Pinterest** | **IFTTT** | **easel.ly** | **MOOC - EdX** | **Hopscotch** | **Jing** | **Hello - Mozilla** | **Conducttr** | **Second Life** | **Canvas** | **Moodle** |  |
| **User experience** | ***Ease of use*** | 4 | 2 | 3 | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 5 |  | 4.0 |
| ***Ease to teach*** | 4 | 2 | 4 | 1 | 4 | 3 | 5 | 2 | 2 | 5 | 5 |  | 3.4 |
| ***Technology*** | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 2 | 5 | 5 |  | 4.4 |
| **Learning Effectiveness** | ***Uniqueness*** | 3 | 5 | 4 | 2 | 4 | 1 | 1 | 4 | 4 | 3 | 3 |  | 3.1 |
| ***Future Use*** | 4 | 3 | 4 | 2 | 2 | 2 | 3 | 4 | 1 | 1 | 1 |  | 2.5 |
| ***Motivates learners.*** | 4 | 3 | 4 | 4 | 4 | 2 | 2 | 5 | 4 | 3 | 3 |  | 3.5 |
| ***Interaction*** | 3 | 2 | 3 | 2 | 3 | 1 | 3 | 5 | 4 | 4 | 4 |  | 3.1 |
| ***Learning Level*** | 3 | 4 | 4 | 2 | 4 | 2 | 2 | 5 | 3 | 4 | 4 |  | 3.4 |
| **Application** | **Feature set** | 4 | 4 | 3 | 3 | 4 | 2 | 1 | 4 | 4 | 4 | 4 |  | 3.4 |
| **Inbuilt Support** | 4 | 2 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |  | 3.5 |
| ***Outside LMS*** | 4 | 5 | 5 | 1 | 5 | 4 | 5 | 4 | 4 | 5 | 5 |  | 4.3 |
| ***Sustainability*** | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 5 | 5 |  | 3.6 |
| **Legal** | ***Cost Inst.*** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 2 | 3 | 1 | 1 |  | 3.8 |
| ***Privacy/Data*** | 4 | 3 | 4 | 4 | 4 | 5 | 5 | 2 | 3 | 1 | 1 |  | 3.3 |
| ***Alignment to policy*** | 5 | 5 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 1 | 1 |  | 3.9 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Total Score** |  | 60 | 53 | 56 | 46 | 59 | 47 | 54 | 57 | 49 | 51 | 51 |  |  |
| **Total Score 5 point scale (1 dp)** | | **3.8** | **3.3** | **3.5** | **2.9** | **3.7** | **2.9** | **3.4** | **3.6** | **3.1** | **3.2** | **3.2** |  | 3.3 |

**Analysis of results**

The highest rated applications are Pinterest (4.1), Hopscotch (3.9) and Conducttr (3.8). The lowest ranking was the edX MOOC (3.1) and Jing (3.1). Four applications are flagged as having a high probability of breaching intuitional policies. The two LMS’s would require significant resources and decision process to replace a current LMS. Easel.ly has a low level of functionality before a student would be required to pay. Requiring a student to use a MOOC as part of the content for their study can require payment from a university or breach core teaching requirements of the university.

The scores for the applications all fall between 4.0 and 3.1, so there is not a significant variation between the very different applications. The variability across the criteria is more pronounced. Here the average scores range from 2.5 (future use) to 4.4 (technology requirements).

All the technologies receive a higher than average (2.5) overall score. The technologies selected were chosen from lists of applications, and often from ‘best of’ lists. The technologies assessed were therefore pre-assessed for suitability to education and technological appropriateness. A more divergent set of scores would be expected if instead of choosing the best products; all products in a particular category were assessed. If each screen capture tool available on the market were assessed, there would be higher and lower scores expected.

The scoring system raises some issues. Initially it was intended to indicate of a tool was a synchronous or asynchronous tool, because this would be of use to a teacher making a technology selection. The scoring system makes implies a judgment of one. This was therefore removed and would be better included in a text description of the product. .

Ease to teach is included, since for many academic staff, knowing an outcome is achievable is an important factor in selection. This lowers the overall score for Conducttr and Second Life, but doesn’t clearly indicate the learning benefits one of those applications could have for a course. Merely having a low score does not indicate an application should not be used, but suggests further investigation is required before it is used.

The scorecard is subjective because it assesses the most obvious use of a technology in an educational setting as defined by the application and the scorer. Many of these applications could be used in other ways. The assumption with Jing is that a teacher would use it to develop a presentation for students to use – the most obvious use. If instead the intended use was for students to write a script, develop a presentation for other students and publish this on the web, the learning goals would be higher and the benefits of using the application could overcome lower score.

The score card is a useful tool for a teacher looking to select a tool or to analyze a tool they have found and would like to test. It is not a ranking system that can with any accuracy determine the best application to use. Before selecting and using a technology (even one with a very high score) the teacher would need to further investigate the limits and benefits of the application as it would be applied to their student cohort and course learning objectives.

**Use of 3 applications in educational setting**

**Conducttr (http://www.conducttr.com/)**

Conducttr is a tool to develop and deliver a scenario through common communication and social media tools. As ‘transactions’ between the students and the system are made through email or social media the student is provided with more information or feedback that continues the activity. A scenario is a complex and time consuming activity to plan and develop, but can be used to develop and apply student knowledge. It therefore lends itself to an end of program learning activity that tests the student’s skills and application of knowledge in a simulated real world situation.

Examples of a scenario with Conducttr could include; students undertaking a negotiation in international relations, medical students responding to medical questions received via emails, marketing students controlling the social media for a movie launch, design students developing a logo for a fictitious company, law students processing a set of client instructions. In any of the specific scenarios the aim is for the students to process and act on the information they have received. The more choices they are able to make and the more complex the concepts, the more design needs to be applied to the design.

An online scenario in Conducttr could be done as a synchronous event where students work in real time through collaboration software. It could also take place over a number of days or weeks, with the students working asynchronously.

**Pinterest www.pinterest.com**

Pinterest is a social bookmarking or curation tool. Students can collect links from the web and arrange them into categorized lists or boards. A broad application for a tool like Pinterest is for students to follow and participate in their future professional community. This could happen as part of an ePortfolio, demonstrating that over time they have been watching the debate that is occurring in their profession. This is a worthwhile but low level learning activity if the sites are simply collected.

In a specific course students could be required to collect a set of articles, or pins on a specific topic related to the course. They could then share the information they had found with other students and participate in a group process to create a ranking of the top ten articles or sites. By analyzing and synthesizing the resources through the group process the students will be exposed to a larger number of resources and be required to apply greater rigor through the ranking process.

**Jing (https://www.techsmith.com/jing.html)**

Jing is a fairly low level screen capture tools that can incorporate a voiceover and simple annotations. The obvious use in education is for teachers to deliver mini-lectures to students. The greater educational benefit at a higher education level would be for students to use the tool to create their own story or content.

In the Pinterest example students could give a visual tour of their pinned content. The students could explain the categorization, enter and explain the importance of a selection of sites. If the class was divided into different content areas, this could become the introduction to a weekly discussion.

The creation of a video can be a time intensive task, so the potential learning benefits would need to be assessed against the time commitment required by the student.

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