

Tracking Technology and Literacy Practices

Looking for Common Ground

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Abstract Technology standards, such as the National Educational Technology Standards (NETS) (ISTE 1999) have been developed to assist teachers achieve technology outcomes. However, these standards do not take into consideration the literacy demands of the technology, and literacy frameworks tend to ignore the place of technology. This paper reports on an exploration of how a technology-focused framework (ISTE 1999) and a literacy-focused framework (Downes and Zammit 2000) can be blended in a way that is useful to teachers. The outcome was the development of a single revised literacy curriculum framework which unites the two areas of technology and literacy.

1. INTRODUCTION

Education systems, professional organisations and researchers have responded to the ever increasing use of new information and communications technologies in classrooms by developing new curriculum frameworks and standards for student learning to support teachers' plans for effective use of technology. Generally, these guidelines or standards focus on technology as a separate area of the classroom curriculum. For example, the International Society for Technology in Education (ISTE) has developed the National Education Technology Standards for students (ISTE 1999); and the UK has developed Schemes of Work for Information Technology as part of their Standards Site (DfEE 2000). Similarly, in Australia, there is now a

separate technology goal in the Adelaide Declaration on National Goals for Schooling in the 21st Century (MCEETYA 1999).

While this approach provides classroom teachers with guidance about the nature of the technology outcomes, it leaves them with the task of aligning these outcomes against those in traditional subjects and of making judgements about how the two areas fit together for effective learning. Teachers generally ask: "How can I use the new technologies to enhance the teaching of English or Mathematics?" Such a question implies a one way process: technology enhancing the subject area. This denies the possibility that the use of the new technologies might demand different literacy and or mathematics learning outcomes or that the careful focus of literacy and numeracy within technology use might in fact enhance technology use.

Downes and Zammit (2000) reviewed the nature of the tasks that students undertook when communicating, handling information and researching with new technologies and found that there are novel literacy demands being placed on students. When using the new technologies, the students were interacting with different types of texts and modes of representation from those they would normally work with in traditional literacy classrooms. These texts required different or additional skills and abilities. So Downes and Zammit (2000) redefined literacy to encompass new modes, mediums and types of text and a broader range of processes. This broader definition generated an expanded curriculum framework with new texts and technologies.

Although there were many advantages to the framework, teachers still had to work out where the technology outcomes fitted into this curriculum framework. Thus they were still asking: "How does the technology fit into this framework"? "This framework still required the teacher to blend the two different sets of outcomes and to generate a framework for integrating the learning experiences. This paper explores how the two perspectives can be blended to be useful to teachers. The methodology included critically evaluating both approaches together. The National Educational Technology Standards developed by ISTE was used as an example of the approach technology focused. Our existing literacies curriculum framework as the literacy focused framework.

1.1 A Literacies curriculum framework

The literacies framework, Figure 1, addresses the demands placed on learners that use traditional and new types of texts for learning about and engaging with their global and digital world. The outcome is of a multiliterate individual, able to be literate in several modes of representation, and to apply their skills and understandings to new learning environments

and other modes of representation. The essential skills of the multiliterate individual are locating, comprehending, using, critiquing and creating texts within personal, social, educational, historical, cultural and workplace contexts.

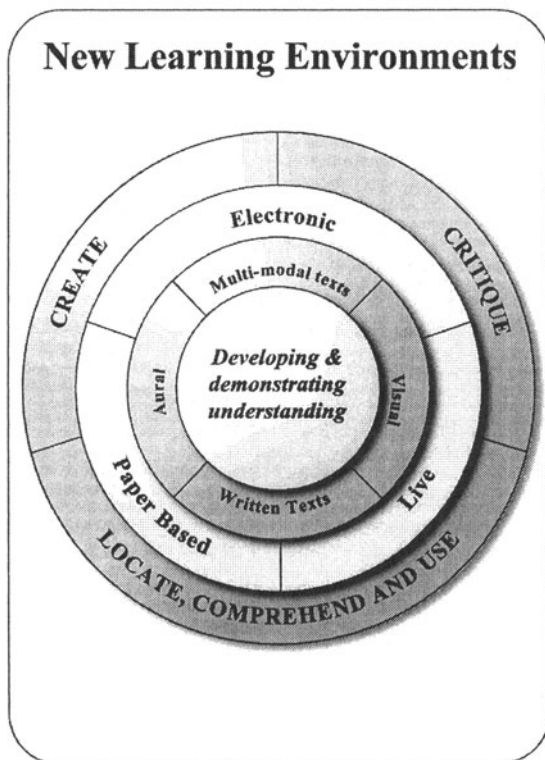


Figure 1. A literacies curriculum model for new learning environments

The actual diagram presents the intersection of the texts, medias and processes required within new learning environments, whatever the subject area. The inner circle is 'Developing and demonstrating understandings'. This emphasises that all teachers and all classrooms are literacy classrooms, where the teaching of literacy is in the service of a deeper engagement with the content of the subject area. The next two layers represent the range of texts and medias with which students engage. They include visual, aural and multimodal texts as well as written texts. The medium of these texts can be live (as in speeches and dramatic performances), paper-based or electronic. The framework recognises that these texts are part of social practices, that they may be part of a collection of texts, and not just individual items.

The outer circle focuses on the processes of teaching and learning, as teachers and students work with texts. Equal emphasis is placed on three sets of processes: 'locate, comprehend and use', 'critique', and 'create'. For many years the emphasis has been on the comprehension and use of texts. Locating texts has become a more strategic skill and is intertwined with 'comprehending and using' as learners move from accessing limited, moderated and ordered collections such as those found in school libraries to accessing the chaotic, anarchic and almost boundless collection of texts in the Internet. Critiquing texts has been a common feature of literary and media studies for many years but not a focus in other more general areas of study.

Teachers can use the framework to map their classroom practices. The mapping can then provide information about the types of texts, medias and processes that students are engaging with regularly and those that need more attention. Teachers can then incorporate those less used texts, medias and/or processes.

1.2 The national standards for educational technology

The National Standards for Educational Technology (Table 1) are designed to provide guidelines for teachers who are "planning technology-based activities in which students achieve success in learning, communication, and life skills" (ISTE 1999). Accompanying the Standards are performance indicators within grade-based profiles and some classroom examples. These indicators and examples help to clarify the six identified foci of the standards. They focus on the students having the necessary technical skills and understandings to use the technology as a tool for enhancing productivity, communicating, undertaking research, solving problems and making decisions and to make appropriate social and ethical decisions about its use.

Table 1. Technology Foundation Standards for Students (ISTE 1999)

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| <ol style="list-style-type: none"> 1. Basic operations and concepts <ul style="list-style-type: none"> • Students demonstrate a sound understanding of the nature and operation of technology systems. • Students are proficient in the use of technology. 2. Social, ethical, and human issues <ul style="list-style-type: none"> • Students understand the ethical, cultural, and societal issues related to technology. • Students practice responsible use of technology systems, information, and software. • Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity. 3. Technology productivity tools <ul style="list-style-type: none"> • Students use technology tools to enhance learning, increase productivity, and promote |
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- creativity.
- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
4. Technology communications tools
 - Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
 - Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
 5. Technology research tools
 - Students use technology to locate, evaluate, and collect information from a variety of sources.
 - Students use technology tools to process data and report results.
 - Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
 6. Technology problem-solving and decision-making tools
 - Students use technology resources for solving problems and making informed decisions.
 - Students employ technology in the development of strategies for solving problems in the real world.
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Recurring themes across the profiles are collaborative activity; personal, literary and informational uses; use of technology to convey information to a range of audiences; use of a variety of resources and tools; problem solving using technology; and the consideration of social and ethical use of technology. There are implicit references to what Downes and Zammit (2000) refer to as medias, modes of representations and texts. While the term 'text' itself does not appear, there are various references to students creating, using, collecting, evaluating such artefacts as products, publications, works and resources – a set of terms that seem to be used interchangeably. There is also in Standard 4, a reference to 'a variety of media and formats'. In this instance the variety of formats could refer to the written, visual, aural and multimodal modes of representation. However, the grade-based profiles and examples do not refer to the different media and formats. In general, the age-based profiles continue to use relatively ill-defined terms such as 'knowledge' or 'multimedia products' or 'information sources'.

Where the standards and profiles do provide greater guidance is in deconstructing for the teacher what are appropriate examples of information systems, hardware and software for the various age groups. As a result there is a progression from skills in using input devices (K-2), to input and output devices (3-5) and troubleshooting across common hardware and software problems (6-8). Similarly, a progression is evident in software use. The K-2 focus is on using developmentally appropriate multimedia resources such as interactive books, educational software and multimedia encyclopaedias, puzzles, and digital cameras. The 3-5 focus on general-purpose productivity tools and a range of others, such as multimedia authoring tools, web tools,

digital cameras, email, and online discussions. In the 6-8 profiles, in addition to the productivity and multimedia tools, is the inclusion of content-specific tools and software, and simulations.

1.3 Technology standards from a literacy perspective

When reflecting on the ISTE standards from a literacy perspective, a number of issues come to the fore. These include the role of hierarchies of technology use, the lack of a strong socio-cultural framework and the need for recognition of the diversity of texts used in concert with the various technology tools. Across the profiles is a hierarchy from personal use to information-based (subject area/concept) use. It is only in the 6-8 level that technology begins to be situated within subject areas. In the early years, the focus seems to be solely on the personal. From the literacy perspective, this is problematic. There are instances in the early years where, with guidance from older peers or teachers, young children could access electronic sources of information as part of their work in Social Studies or Science.

Similarly, the standards imply that access to web tools and web authoring should not begin until students are in year 3. Students from an early age study factual topics and work with a range of texts and representations. With the support and guidance young children can create a simple multimedia presentation on a webpage to demonstrate their knowledge and understandings to peers in other schools. From a literacy perspective, if the content and processes are appropriate and important, it is the teacher's role to scaffold the processes of using the technology until the children begin to develop independence. This is the common approach with paper-based technologies. Parents move almost seamlessly from holding the books as they read to their very young child, to sharing the hold on the book, to allowing the child to hold and turn the pages as they decide when the pages have been read. The classroom teacher must recognise that the technology should be accessible to children of any age.

Although the standards refer to social and ethical use, there is limited reference to the sociocultural nature of the texts and the tools, particularly as these are cultural artefacts, which represent particular views and opinions dependent on the cultural background of the developers. Knowledge of the cultural aspects of texts can strengthen students' critical orientation to the use and reading of technology tools and their accompanying texts. There is also the need to situate the use of technology within a purposeful context and for a range of social purposes. It is not enough for students to use the Internet to access information on any topic of their choice. This will not provide them with a deeper understanding and greater knowledge. To change information into knowledge requires a purposeful context, where the texts

that are being used, whatever the mode, are considered, critiqued and discussed. For example, in Australia, secondary students read texts about the Cold War that are written from an American perspective. Texts that convey a different perspective may be available to students through the Internet and active reading of the construction of these texts – Why were they written? Who wrote them? can provide students with alternative voices about an event, and skills to deconstruct other texts they are reading. However these are often ‘read’ as propaganda by the teacher, without considering their sociocultural construction. By having a clear purpose, embedding the use of technology in a topic, can provide students with deeper engagement with the text and provide the sociocultural and critical component lacking in the decontextualised use of technology.

The standards also need to recognise the diversity of the texts that make up the different technology tools. This includes the different genres and the demands on the user to read them, as well as recognising the different modes that information and the technology tools may employ – visual, aural, written, multimodal. The standards need to acknowledge the demands (literacy) of the different technology tools and their environments. For example, the literacy demands of reading from a computer screen are more complex than reading from a book. Layers of meaning (e.g. system level, browser level, site level) are stacked on top of each other with colour, position and perspective used to differentiate them; icons, symbols, labels play different and intersecting roles in providing access to the features and functions of the tool.

1.4 Literacies framework from a technology perspective

When reflecting on the multiliteracies framework from a technology perspective, a number of issues emerged, relating to the lack of attention to the diversity of tools and technologies implicit in the literacy processes. Other issues include the pedagogical demands on teachers when hierarchies of skills, knowledge and understandings are abandoned.

The model is silent in relation to the variety of technology tools and the need to select the appropriate tool according to the medium of construction and the mode of representation. Therefore, there is no rationale or description about how the tools are in fact linked to the purpose of the task, the curriculum content, or the use or creation of a text, and the needs of students. The framework needs to take into account the technology tools, and hence the ability to use them, so teachers may select the tools as well as the medium, mode and process to incorporate into their teaching. In doing this, the technologies and tools of the paper-based medium need to be articulated to sit alongside the newer digital technologies and other electronic

technologies such as the television, the telephone, the video. By making explicit all information and communications technologies: those implicit in the traditional definitions of literacy; those that construct the field of study called 'media studies' and the newer digital technologies; the teacher is presented with a more integrated framework, where literacies and technologies meet.

The framework does not have an implicit hierarchy of skills or understandings. At the centre of the framework is 'the development and demonstration of understandings'. As teachers make decisions about the resources, experiences and activities, that they want their students to interact with and reflect upon, they identify the processes, mediums and modes of representation that the students will encounter. From this point they plan their literacy programme. It is an implicit expectation that teachers will draw upon the teaching strategies of teacher demonstrations; peer-supported, joint constructions (teacher-students, group work); and independent activity. It is only with a repertoire of strategies that teachers can free themselves from an hierarchical approach to skill development and use of technologies.

1.5 A redeveloped literacy curriculum framework

The redeveloped literacy curriculum framework makes explicit the diverse range of ICT that underlie the three media: paper-based, live, and electronic. In creating a field to record these technologies and their tools, the order of the concentric circles was re-organised to better reflect the natural progression of the elements of the framework. They are identification of: key concepts and understandings to be developed/demonstrated; key literacy processes used to demonstrate these, forms of representation, through the medium of these texts and specific technologies required. Figure 2 provides a visual representation of the revised framework.

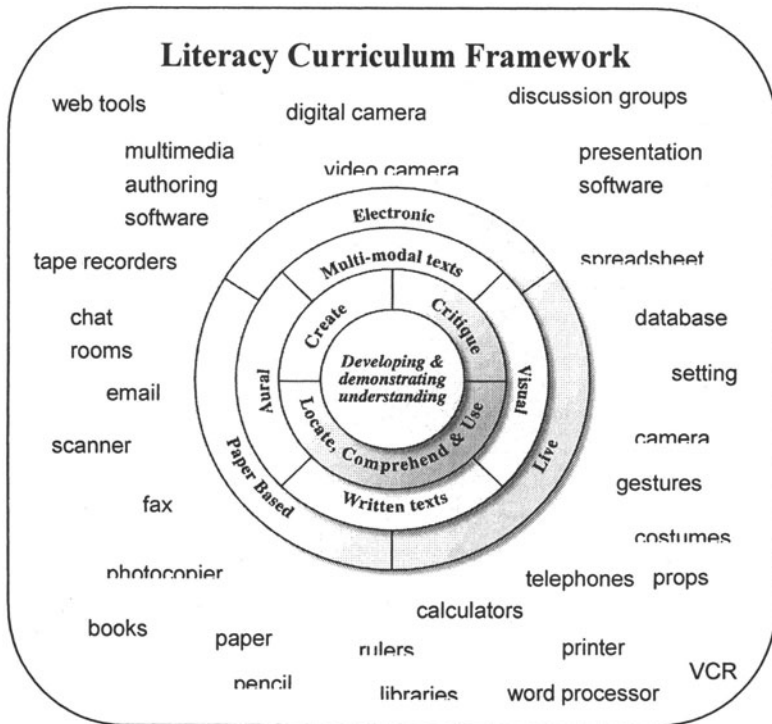


Figure 2. Revised Curriculum Framework

In this framework it is not the range of tools that are subject to a developmental scope and sequence as is the case in the ISTE (1999) technology standards and profiles. As technology is the tool, it should be integrated and selected according to the purpose and needs of the teacher and students. Hence, the tool is chosen to serve the literacy purposes or the teaching purposes. Selection of tools is not age or grade-specific nor dependent on technology skill level. If the necessary tool is too complex for independent use by the age group then skill development can be a whole class activity led by the teacher, a group activity led by peers with expertise or a paired activity where ‘a driver’ interprets the child’s instructions so that the task is completed. In this framework what varies is the level of support, instruction and guidance, which will be related to the students’ abilities and prior knowledge rather than just their age group.

2. CONCLUSION

We will be working in a number of classrooms of primary-aged children over the next twelve months. The feedback from the trial will be used to further modify the curriculum framework so teachers can use it in planning their integrated units of work. At the broader policy level, this mapping process and its outcome suggests that the approach of critiquing two frameworks against each other provides one way forward in the curriculum development process needed to increase the effective integration of the new ICTs into classroom learning. The advantage of the approach taken is that the two perspectives, the literacy and the technology perspective, can be accommodated within the one framework in a way that is useful and understandable to teachers.

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BIOGRAPHY

Dr Toni Downes is an Associate Professor in educational computing; her research projects span from early childhood education to university education. Katina Zammit is a Lecturer in language and literacy; her research interests revolve around the analysis and use of multi-modal texts for literacy learning and teaching.