

Towards a Framework for Evaluating ICT-Based Materials

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INTRODUCTION

Information and communication technologies (ICTs) present interesting challenges for educators and ICT designers, not the least of which is the evaluation of learning. Syverson and Slatin (1995) argue that software and hardware have evolved into a bewildering range of programs and peripherals while networks innovations add still another layer of complexity. As a result, teachers must not only continuously learn how to use these rapidly changing technologies, but they must also rethink their teaching practices, design new activities for teaching and learning, and try to evaluate the learning of students as they engage those activities.

What makes the evaluation of ICT-based learning more problematic is the issue of just what is being evaluated. For example, although there is an extensive and ever-growing literature about “learning objects” (LOs), the clarity of the term continues to be elusive (McGreal, 2004). The various approaches to defining LOs attempt to meet two common objectives: to reduce overall costs of digital resources and to obtain better learning resources (Wiley, 2003), but these two objectives often receive differing emphases. For example, Downes (2001) stresses efficiency while Duval, Hodgkins, Rehat, and Robson (2003) focus on effectiveness. Further, while some writers (Mortimer, 2002) claim that most LOs have clearly defined characteristics, there is ongoing disagreement about the nature of these components (Merrill, 2002).

Nevertheless, irrespective of how LOs are defined, there are “great expectations for [them to] transform teaching and learning practices” (Moore, 2003-2004, par. 2), and their *raison d’être* is their ability “to improve student learning” (Moral & Cernea, 2005, p. 3) by engaging students with the designed learning material, the subject content, and the delivery system. Hence, any discussion on criteria for evaluating ICT-

based materials needs to acknowledge the complexity of the concept of student engagement (Clarke, 2004) and how it is operationalised in LOs to enhance learning outcomes.

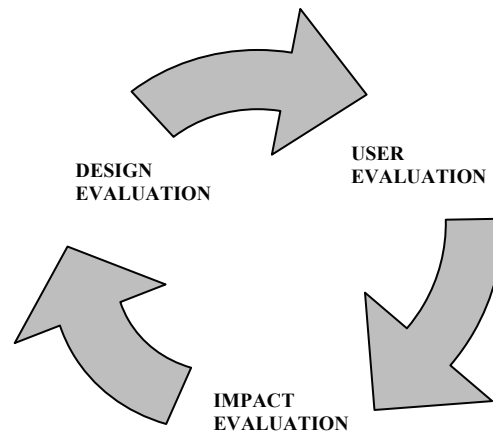
EVALUATING ICT-BASED MATERIAL

The evaluation of ICT-based materials requires the development of criteria for judging them, entities that are not readily available (Currier & Campbell, 2002). Haughey and Muirhead (n.d.) claim that attempts to evaluate such materials are “fraught with complexities not found in assessing other non-digital educational content” (p. 13) because such materials differ from more traditional learning materials in significant ways: They use a variety of media such as text, graphics, sound, video, and music; the content has to be disaggregated to an optimal size and both the content and structure have to be flexible enough to maximise reuse in a variety of contexts (pp. 13-15). Furthermore, the ICT infrastructure has to have sufficient capacity to run the materials.

It is not surprising then that most current evaluation processes (e.g., Carr, 2000; Griffin, 2003; The Learning Federation, 2002) concentrate on being sensitive to the overall goals that designers and developers have for such digital assets as well as the constraints upon designs imposed by the subject content and the infrastructure capacities. However, this “design and development” phase is only the beginning. Like most product development, there is a cycle which includes:

- The design and development phase of the LO
- The intended audiences’ reaction and uptake of the LO
- The actual impact and outcomes facilitated by the LO

Figure 1. The beginnings of a framework for evaluating ICT-based materials



When these three phases of the product development cycle are considered, any framework that proposes to evaluate LOs will need to incorporate criteria for judging them at each phase. These evaluation foci are referred to here as:

- Design evaluation
- User evaluation
- Impact evaluation

These foci provide the beginnings of a framework for evaluating ICT-based materials as summarised in Figure 1.

Before dealing with each of these foci and the criteria associated with them, it is necessary to discuss the pedagogical principles underpinning the framework that guide the educational soundness of the design, use, and impact of ICT-based materials.

PEDAGOGICAL PRINCIPLES FACILITATING STUDENT ENGAGEMENT

A recent comprehensive list of criteria with a specific focus on how online curriculum materials may facilitate the engagement of students has been generated by The Le@rning Federation (TLF).² The criteria are designed to provide specifications for the educational soundness of online curriculum materials (TLF, 2002) where “educational soundness” is defined as “the capacity of online curriculum content to successfully promote

student learning” (p. 4). The criteria “provide the broad framework for the design and development of ... online content” (Atkins & Jones, 2004, p. 2). The criteria, which have received international recognition (Haughey & Muirhead, n.d) and are metatagged to Australian school curricula, are underpinned by the four principles of learner focus, integrity, usability, and accessibility. These principles, all of which articulate with the notion of engagement, are defined and discussed in detail in TLF (2002) but are summarised below.

Learner Focus

This will be achieved by designing a LO that:

- Reflects the relevant learner profiles based on intended users (e.g., age and stages of schooling; socio-economic status) and enables learners to interact with, organise, represent, interpret, and manage the process of learning and the information flow (e.g., making choices and decisions, inquiring, investigating, and problem solving)
- Makes explicit and consolidates the process of learning (e.g., structuring informational content in order to scaffold student learning)
- Contextualises student learning (e.g., establishing connections with prior and likely future learning; supporting communication, activity, and collaborative action, both online and off-line)
- Maintains learner focus through the interaction between users and the learning content (e.g.,

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