

*Pedagogical strategies to find success
with computers in the classroom:
Benefits, challenges and tips*

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ABSTRACT:

Computer use is a necessary skill for students to master if they wish to pursue their educations, compete for employment in the modern workplace, and thrive in an increasingly computerized society. However, effectively bringing computers into classrooms can be a new and challenging experience for teachers who have limited experience in doing so. This paper will summarize some of the benefits of Internet-equipped computers in education, outline the challenges of integrating this technology into classrooms and make general recommendations for planning and implementing computers in classrooms.

INTRODUCTION:

It has become uncontroversial to argue that the development of computer skills is vital for individuals who wish to take part in an increasingly globalized and technologically-rich society. One of the signal developments of the late 20th and early 21st centuries is the industrialized world's increased dependence upon Information Technology (IT) as an integral part of work, education and daily life. Not only have networked computers become ubiquitous tools in communication and an increasingly-important component of maintaining a net of acquaintances, being able to use such

technologies has also become a vital ingredient for a skilled and productive future workforce (OECD, 2013). Indeed, the view of making technology an elemental part of reforming education for the future was formally adopted as a policy in 1993 by the U.S. Department of Education. The report asserted: “technology supports exactly the kinds of changes in content, roles, organizational climate, and affect that are at the heart of the [education] reform movement” (United States Department of Education, 1993). Now, well into the second decade of the 21st century, IT has become an irreversible part of educational priorities worldwide and occupies a central place in global society

Because of increasing demand for people skilled in IT, educators often wish to prepare students for their educational and career aspirations by providing them with the experience and knowledge they need to accomplish them. Unsurprisingly, many students now expect that these skills will be part of their school lives and embedded within their classrooms and libraries. Over years of attempting to effectively use computers in teaching, the experience of this author has revealed that even though doing so can bring-about an array of benefits and challenges for everyone involved, it also requires strategies for implementation if it is to be successful. These factors for planning and execution should be carefully considered beforehand if educators wish to effectively turn computers into a more potent component of their teaching repertoire and build IT capabilities within their schools’ learning environments.

BENEFITS AND PROBLEMS

There is an enormous body of research on the benefits of computers in education which extends back decades, covering multiple types of school disciplines. Naturally, over that time, enormous strides have been made in hardware and software; rapid changes have also taken place in the uses and the centrality of IT as a curricular priority and teaching modality. To give one major example, the emergence of the Internet fundamentally changed the architecture and use of computing well beyond what was widely available to most schools and libraries as recently as the mid-1990s. Furthermore, the addition of mobile computing using wireless networks marks another significant leap forward in development. Because of the swift evolution of IT, what was commonplace in education today will be anachronistic or obsolete in the not so distant future. It is, therefore, somewhat difficult to apply findings from earlier studies to more recent developments even though a number of certain trends have nonetheless held-true over time while experts frequently stress in their research that more work needs to be done to expand and renew our understanding in this quickly-changing field (Fouts, 2000). Regardless, the promise of IT in education certainly combines benefits for students and teachers alike.

Many researchers and educators have argued that the use of IT in classrooms supports students by furnishing them with a variety of benefits and opportunities such as the ability to access information from multiple sources via the Internet and the opportunity to practice collaborative problem-solving with peers (Bebell, 2005; Gahala, 2001; Honey et al., 2005). The use of IT in the classroom can also provide valuable beneficial experiences and abilities such as the development of critical thinking and problem-solving skills in addition to increased familiarity and comfort with

computer technology (Cradler et al., 2002; Fouts, 2000; Johnston, 2000; Means, 2000; Schacter, 1999). Importantly, surveys show that students enjoy their classes more when computer-based instruction is involved and they tend to feel that time which is spent on using computers is a good utilization of class time (Kulik, 1994). Additionally, there is broad agreement among researchers that using computers in classrooms can better prepare all students for participation in a technologically-rich society and workplace regardless of race or gender (Anderson-Inman, 1990; Hoot, 1986; McKay, 1998; Nieman, 1996; Owston & Wideman, 1997; Rogers, 2003).

Apart from benefitting students by enriching their classes and offering chances to develop their skills and familiarity with IT, there is also a new and growing argument which asserts that educating individuals in the use of computers helps them to empower themselves by enabling them to more broadly exercise their human rights. In particular, this belief asserts that governments which wish to promote a free and open society have a responsibility to ensure reasonable, widespread and unencumbered Internet access as a part of their citizens' exercise of free expression. The principle of Internet connectivity as a human right was officially proposed at the 2003 United Nations World Summit on the Information Society in Geneva in 2003 (World Summit on the Information Society, 2003). Similarly, in 2011, a UN Special Rapporteur report to the UN Human Rights Council made multiple recommendations on the right to for the Internet to be open to all and recognized the Internet as being a "powerful" tool for "access to information" in addition to "facilitating active citizen participation in building democratic societies." (Report of the Special Rapporteur, 2011). A similar argument has been expressed by Hillary Clinton who, as U.S.

Secretary of State, argued that ensuring an open Internet is a form of freedom of association, with the online world functioning as a forum for public discourse and peaceful assembly (Clinton, 2010). From this perspective, IT education can arguably be seen as a means of offering people an extended means of exercising their fundamental rights.

Although the primary aim of including IT in schools should be helping students, teachers are also beneficiaries of the integration of IT into their classrooms because it places additional tools and resources at their command. Some benefits for teachers include an increased ease in matching and tailoring instructional materials to students' needs, learning styles and interests (Teo, Lee, & Chai, 2008). For example, classroom computers can facilitate more customized forms of instruction when meeting the needs of under-performing students, students with disabilities or students with non-native proficiency in the language of instruction. Teachers can also take advantage of opportunities such as online courses, seminars and workshops in addition to gain more exposure to a greater array of information to upgrade their skills and advance their professional development (Dunleavy et al., 2007; Fouts, 2000). Teachers can also use computer-based testing to carry out assessments more quickly because such tests are easier and faster to score (Sabzian, & Gilakjani, 2013). These are just a few of the secondary benefits which teachers can enjoy when making an effective use of IT in their classrooms.

Conversely, many different scholars have noted that the integration of computers into education can involve significant problems and challenges. As a result, planning and preparation must be undertaken by a school's stakeholders for implementation to successfully take place. For instance, one well-acknowledged fact in the research literature is that the introduction of computers

into classrooms is not, in of itself, a panacea or a replacement for traditional teaching (Valdez, 2005). The indiscriminate endorsement and acquisition of technology without aligning it with the school's teaching context, objectives or curricular needs will be unlikely to result in improved outcomes for students. Poorly-planned technology inclusion can frequently turn into a waste of time, effort and money (Cooley, 2001; Dunleavy et al, 2007; Jackson, 2004; Valdez, 2005). Another concern about effective IT implementation, nearly ubiquitous in its acknowledgement across the research, is the considerable financial outlay which is required to pay for equipment, software, infrastructure, technical support and teacher-training. The cost of acquiring new technology also includes the cost of support, integration with legacy systems and future obsolescence (Cradler, 1996; Gahala, 2001; Honey et al., 2005; November et al., 1998). The expenses of upgrading a school's IT may force a reduction of funding in other areas of school activity so a new investment in technology frequently needs significant rationales to justify it (Blumenfeld et al., 2000; Oppenheimer, 1997). These concerns should be kept in mind when going-through the process of planning the addition of new IT for schools.

STRATEGIES

After several decades of widespread consensus that IT should enjoy a more central position in teaching, one major and enduring question is how this can be done in a way which enables the best outcomes for students and avoids the most common pitfalls. The preponderance of research on the topic has agreed that planning is vital to successful technology implementation; conversely, a commonality of poor outcomes in school technology programs is that they failed to adequately prepare plans or implement plans

which had been created (Barrios et al., 2004; Fouts, 2000; Marshall, 2002; Sivin-Kachala & Bialo, 2000; Valdez, 2005). For best results, schools should roll-out computer technology as part of a comprehensive plan rather than by introducing new machines or software into classrooms in a piecemeal or ad hoc fashion (Cradler, 1996; Hopey & Knuth, 1996; Protheroe, 2005; Zucker, 2005). New technology should match schools' curricular goals and be appropriately aligned with the students and teachers who will use it (Sivin-Kachala & Bialo, 2000).

Another recommendation from multiple studies is that teachers have an extremely important role to play in the planning, selection and deployment of new education technology (Donovan et al., 2007; Lee, 2006). This is partly because teachers possess pertinent knowledge about their classroom conditions and student needs and partly because teachers should ideally feel that they have a stake in its success (National Education Association, 2008). Studies have also shown that teachers are more likely to make use of a given technology investment and regard it as advantageous if they could exert some influence in its acquisition and deployment. (Donovan et al., 2007; Lee, 2006; Marshall, 2004). To give one such example, the RAND Critical Technologies Institute (1995) examined case studies of schools which the U.S. federal government's Department of Education commended for effective use of technology, noting that teachers in those schools had been closely involved in developing their programs' learning goals and deciding how the technology should be used. Soliciting teachers' knowledge and involvement should, therefore, be regarded as a vital part of planning the inclusion of new technology and a knowledge-resource to be called upon during the planning process.

When integrating computers into classrooms, it may be advisable for teachers to use the Internet to connect their

classrooms to people outside the school in order to form closer bonds with families and the surrounding community. For instance, it is possible for a teacher to cheaply and easily create web-pages where visitors can obtain syllabi, schedules of school events and up-to-date homework assignments. Teachers may also choose to use their web-page to provide links to resources which supplement in-class work, assist parents in becoming better-informed and more active agents in the education of their children and make information available to other community stakeholders (Ramey, 2012). A number of other studies have shown that members of a community frequently have a strong interest in school technology programs and it is necessary for schools to obtain their community's support and endorsement (Jackson, 2004; Poole, 2008; Zucker, 2005). Making the teaching content of one's classroom available to the public can also help make a school more transparent and comprehensible to outsiders; this is important because successful use of technology in schools frequently involves the input of community stakeholders, especially parents, so it is a helpful step for a teacher to help facilitate this kind of involvement (Belanger, 2000; Rodriguez & Knuth, 2000).

Another strategy for teachers to make effective use of IT is to take the initiative to become more practiced with widening the kinds of technology they can bring into class. A number of studies have stated that becoming more accustomed to new computer technology is an important part of being a more effective instructor and that taking advantage of professional development and learning opportunities is helpful in achieving this goal (Bonifaz & Zucker, 2004; Gahala, 2001; Snyder, 1995; Zhang, 2005). Part of this is the skill of dealing with troubleshooting minor technical problems which invariably appear with IT use as well as being able to perform some rudimentary computer maintenance. Even in the

best-prepared class, teaching technology can nonetheless be occasionally subject to unforeseen failures. Because of this, teachers should practice computer-based activities during the lesson-planning stage or, at the very least, before class begins. Several studies have concluded that a teacher's ability to manage classroom computer activities is a more important skill than their technical expertise (Mcalister et al., 2005; Veen, 1993). It is a better use of time to address problems during teaching preparation than to encounter a disruptive unexpected technical malfunction in the middle of class.

Finally, because the Internet is a giant and constantly-changing resource for students and educators, it is helpful for a teacher to routinely dedicate time throughout the semester to search for useful new resources online. There, teachers can find a wealth of lesson plans, worksheets, activity ideas and rubrics tips for a variety of subjects and age-levels, many of which can be obtained for free. Additionally, teachers can also benefit from investing this time to preview materials such as educational audiovisual recordings, news on current events relevant to class work and sample education software, all of which can be used to enrich and enhance classes. Indeed, several studies have found that online interaction, like in discussion forums, is helpful for teachers who wish to use technology in the course of their teaching because such forums are places where teachers can share advice, read textbook reviews, access education journals and more (Coniam, 2002; Ducate & Arnold, 2006). Despite the fact that teachers have limited time, their effectiveness and professional growth can be greatly enhanced in the long run by regularly making a modest investment of time to explore the huge, varied and rich arrays of education resources which are available to assist them online.

CONCLUSION

In conclusion, computers in education can bring a myriad of benefits and opportunities to students and teachers, provided that the technology is properly planned, implemented and utilized. Nonetheless, despite the great promise and potential that IT brings to the classroom, it is important to stay mindful of the fact that this technology should not be regarded as a panacea or easy fix-all for classroom problems. IT in education should primarily be seen as a tool. Like any other kind of tool, it can enable students and teachers to be more productive in their work but it must be used properly; IT also has its own attendant problems and drawbacks which need to be understood in order to create the desired results for students. Internet-equipped computers can be used to supplement and enhance educational materials and teaching but they cannot replace a good textbook, an experienced teacher or a well-prepared lesson plan. Teachers are well-advised to follow strategies and carefully plan ahead to ensure the effective use of computers in their classes. These strategies include being involved in school IT planning, connecting to surrounding communities, becoming more familiar with the troubleshooting aspects of the technology and regularly investing the time necessary to explore new IT education resources. By understanding the benefits, challenges and strategies for in-class IT use, teachers can improve the possibility of creating good outcomes for their students and their students can become better-prepared for a future outside the classroom.

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