

Efrat **BARANETZ**

Hovav Elementary School, Israel; doctoral researcher, MSU

How To Enable Successful Use Of ICT

Rezumat: Această lucrare conține o descriere a factorilor individuali care permit utilizarea TIC, urmată de un șir de explicații de ce TIC nu sînt implementate pe larg în sistemele educaționale. Sînt oferite șase abordări privind utilizarea cu succes a TIC la nivelul școlii și analizați factorii de integrare optimă a TIC în demersul la clasă. Ca urmare, sînt formulate opt recomandări pentru cadrele didactice care doresc să aplice TIC în mod eficient. De asemenea, este specificat profilul

comportamental al cadrelor didactice care practică pedagogia bazată pe TIC.

Abstract: This paper begins with a description of the individual factors which enable ICT use followed by the possible explanations why ICT has not reached critical mass in the education systems yet. Six approaches are being offered for successful use of ICT at school level, and the critical factors for effective integration of ICT in the classroom are listed. As a consequence, eight lessons are suggested for teachers who wish to use ICT effectively. Finally, the behavioral profile of teachers implementing the ICT pedagogy at its based is specified.

Keywords: effective teaching, successful use of ICT, ICT integration, Teachers integrating ICT, TARGET, ICT proficiency.

INTRODUCTION

Most frequent **individual** factors which enable ICT use according to the survey conducted by Scrimshaw [14], fall into three categories:

- a. Ensuring awareness, capability and confidence in teachers in relation to using ICT.
- b. Ways of ensuring access as required to reliable systems.
- c. The educational benefits of using ICT, either through making teaching and learning more effective or by enabling kinds of learning that were not possible before.

What is required, Scrimshaw [14] continues is an approach that makes a number of changes together:

1) Enough planning and preparation time are required to integrate ICT into day-to-day teaching; 2) The employment of an ICT teaching assistant to share the preparation and set up time; 3) An integrated approach to using ICT that recognizes it as a complex and wide ranging innovation.

The question arises according to Scrimshaw [14] is “why an innovation that has been present in schools in some form for around 20 years has not yet reached critical mass.” [14, p. 13] The literature presents four possible explanations [14]:

1. ICT does not fit with some teachers’ wider educational beliefs.
2. There may be immovable social obstacles.

3. There may be powerful but removable obstacles in schools to expansion of use.
4. The obstacles may be to do with the personal characteristics of some teachers.

Groff & Mouza [6] believe the real question is “Why is it that so many teachers use computers to increase their own efficiency and productivity, yet do not strive to find effective applications for their use as instructional tools? What is it that keeps teachers from making this quantum leap?” [6, p. 22] Identifying potential obstacles can empower teachers to seek solutions early in the process, consequently increasing the probability of experiencing success while integrating technology [6].

APPROACHES THAT SUPPORT SUCCESSFUL USE OF ICT

Scrimshaw [14] points out to approaches that support successful use of ICT in **school level**, these approaches include:

1. Leadership and decision making – The role of school leadership is clearly central, the leadership should be collaborative, supporting innovation and risk taking, and include others in decision-making.

2. Whole school planning and implementation of the change – Bryderup & Kowalski [in 15] warns that a plan is a guide to action not a substitute for it. This means that it is not just a matter of having a whole school approach to ICT, but setting it within the wider pattern of changes needed. Kennewell et al. [in 15] adds that a good ICT plan should also include an assessment and evaluation approach to reflect a clear view of ICT use.

3. Whole school use and development of resources – The move to viewing curriculum resources as something to be jointly developed by the staff of the school, linked closely to what teachers actually want and need. However, this creates a need for teacher training in their production and classroom use.

4. Knowledge sharing and training – professional development as well as the willingness to learn from, and support, each other, Feeling comfortable asking each other questions, no matter how simplistic these seem. Groff & Mouza [6] agree, they also speak of administrative support (or the lack of it) that can either make or break a teacher’s attempt to integrate technology into the classroom. According to Tondeur and colleagues [15] professional development should stay at the center of an ICT policy.

5. Roles of technical support staff – It is clear that the technical support for teachers and students should be a reliable and accessible service, and requires cooperation between all parties concerned. Yet, AsSomekh [in 15] warns that needs for technical support tend to take priority over curriculum support.

Groff & Mouza [6] agree that there are factors at

school level and also factors associated with teachers, which are critical to the successful integration of ICT in the classroom. However, they note the following four additional factors:

1. Legislative factors – “The lack of research on the efficacy of technology-based instruction and legislative policy that shifts frequently or is innately designed to facilitate the introduction of technology in the classroom.” [6, p.26]

Tondeur and colleagues [15] agree, emphasizing that policy plan is important but only when teachers are aware of its content. Olson [in 15] suggests establishing a dialogue based on equality between principals and teachers. Engaging teachers in the development of an ICT plan, allows them to reflect on their educational use of ICT.

2. The technology-based project/innovation – a project/innovation can become an obstacle to the success of integrating technology, if it exhibits distance from the school context and dependence on resources outside of the teacher’s control. Neal [12] adds that when the learning tasks provide little opportunity for students to explore their thinking and understanding, most of them will become passive learners. Levin and Wadmany [10] agree, the effectiveness of ICT depends in using Information-rich projects, which according to students are significant both in terms of interest and in terms of benefits for the short and long range.

3. The Students – Student characteristics must be taken into consideration when trying to identify potential obstacles. Their prior experiences with technology-based projects, attitudes and beliefs, and technology skills that they bring to a proposed project can substantially influence its success. Neal [12] adds that the teacher’s awareness of the way a student will benefit from different learning experiences, contributes to increasing the learning process. The effects of the teacher and the teaching styles have a strong impact on students as they consciously and unconsciously obtain new skills and knowledge.

Similarly, Levin and Wadmany [10] found that using ICTs in the learning process increases the responsibility of the student for his learning and helped him become a self-oriented student. Furthermore, Levin and Wadmany [10] report that unique connections developed between the teachers and the students, they became active partners in a mutual-sharing relationship.

4. Technology – There is almost an infinite list of potential problems that the technology itself can present, such as: hard drive failures, insufficient memory, software problems, files problems and network connection problems. In order to avoid such challenges, Groff & Mouza [6] recommend working with up-to-date technologies, building a strong infrastructure and as Scrimshaw [14] suggests, have a coherent technology team.

Groff & Mouza [6] focus primarily on four factors that can be directly addressed by teachers, while presenting their solution called *i⁵*: Context, the Innovator, the Innovation, and the Operators. The *i⁵* is essentially designed as a means of surveying. There are a total of 12 variables presented that could potentially facilitate or hinder the effective implementation of technology. Groff & Mouza [6] believe that the *i⁵* can help individual teachers to successfully integrate technology, by identifying potential obstacles upfront and seek solutions early in the process.

Byrom and Bingham [3], in their attempt to find the factors influencing the effective use of technology for teaching and learning, created eight lessons:

1. Leadership is the key ingredient – Leadership at all levels (state, district and school) is the most important factor affecting the successful integration of technology. Byrom & Bingham [3] emphasize the fact that it is especially important at the school level for the principal to have a vision of what is possible through the use of technology and to be able to work with others to achieve the vision. Effective school leaders focus on reform initiatives that offer the most promise for improving teaching and learning, and they ensure that their school has the resources, skills, and time necessary for turning the promise into reality. They also show both interest and trust in decisions made by the school technology committees. Finally, professional development is necessary as school teams strive to reach their vision for technology, an effective principal uses evaluation to further professional growth.

2. A comprehensive plan – “Each organization, whether it is a district or an individual school, needs to spend time developing and updating a comprehensive plan: starting with its vision, mission, and goals. The degree of success that a school has in implementing technology will depend, in part, on the quality and maturity of its technology plan. A useful plan reflects the ideas of an entire school community and is connected to overall school goals. It focuses on the use of technology to support teaching and learning.” [3, p. 6]

3. Technology integration is a slow process – Truly integrating technology into teaching and learning is a slow, time-consuming process that requires substantial levels of support and encouragement for educators. Byrom & Bingham [3] estimate this process from three to five years.

4. Teacher adoption of technology use – Although it is still surprising to see how many teachers do not use technology at all, the solution according to Byrom & Bingham [3] may be found in professional development that can easily be applied to experiences leading to technology use, a direct linkage with the curriculum, teaching strategies, or improvements in achievement.

And finally, the use of teachers as mentors and coaches: teachers-teaching-teachers is usually more effective than technology specialists teaching teachers.

5. Changes in the way teachers teach – This means that teachers embrace strategies for student-focused learning. “it is the combined effect of pedagogically sound teaching practices and appropriate technologies that lead to improvements in learning.” [3, p. 15]

6. Technical and pedagogical experts – Teachers need on-site and on-demand technical assistance with both the technology and the integration of technology into teaching and learning (pedagogy)

7. Additional obstacles for students in economically disadvantaged areas – These obstacles include basic electricity that is not sufficient, difficulty in establishing an infrastructure and staff turnover which is often high.

8. Lack of evaluation of technology programs – Most schools, have technology plans, but many of these plans still lack strategies or tools for determining whether the efforts have had any impact. “Educators want tools to track progress, they need tools and processes to track and document their technology progress – tools that help them reflect on where they are and where they need to go with their technology initiatives.” [3, p.20]

THE ROLE OF TEACHERS IN INTEGRATING ICTS INTO THE LEARNING-TEACHING PROCESS

Many researchers discussed the question “Who is a good teacher?” and although it is difficult to reach agreement, three categories are recognized [Hinchey, in 8]: ‘Teacher quality’, which is namely teacher’s characteristics. ‘Teacher performance’, what he does inside and outside the classroom (such as interaction with learners), and ‘teacher effectiveness’, his influence on learning among his students (such as their achievements and motivation).

Studies have shown that the main factor for creating significant contribution of technology to the learning process in school is the number of teachers who use technology wisely [7]. Therefore, she recommends, it is very important that investment in technology, will also include as integral part-teacher training: Teachers that will use technology wisely as a contributor tool to pedagogy. But technical training is not enough, in order to effectively integrate technology into teaching, training should emphasize how and when technology is integrated effectively for the achieving of specific pedagogical goals. A variety of methods for effective integration should be presented, so that the application will be pedagogical and not technical. Training should also emphasize simple tools, those that the teachers can integrate without the need for complex preparations [7].

Leading technology teachers should be allowed

to serve as a model and advice their colleagues. It is also important to understand that a single training is not enough to make the necessary change. It takes an ongoing annual process, accompanied with technological and pedagogical support. Dresler & colleagues [5], while trying to answer the question “what is the behavioral profile that is characteristic for teachers that are implementing the ICT pedagogy at its best?” Found the answer in Ames’ [in 5] six elements called TARGET:

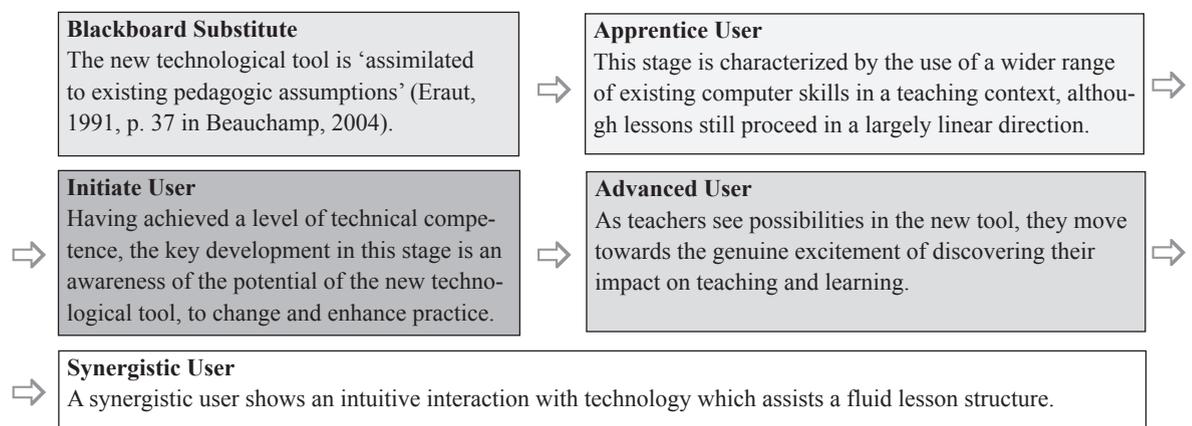
- **T**ask – The value of a task is assessed by its importance, interest to the student, usefulness or utility, authenticity, and the cost in terms of effort and time to achieve it.
- **A**uthority – Learning can be based on the authority of the teacher that dictates its pace and frames. Authority that constitutes a significant figure for the students, in mediation processes of the learning. The educator is not just a teacher he is also a learner.
- **R**ecognition – Adapting the curriculum to the learning style, the social emotional needs, the cognitive abilities, desires and other personality variables.
- **G**rouping – Strategies for teaching-learning-assessment based on the cooperative of teacher-learning-Group provide the learners opportunities for social interaction while experiencing many different dialogues. Learning outcomes reflect the thinking processes and actions of the entire group (shared cognition), and not just the individual learner.
- **E**valuation – Using a variety of alternative assessment methods – corresponding to the objectives of the assessment and evaluation subjects. Intelligent use of evaluation findings to improve teaching and learning processes
- **T**ime – Reference to time in designing the curri-

culum, such as: time allotted number of lessons per week, time management according to the assigned tasks.

Helping educators to change, is the key to fostering ICT integration, and some researchers have identified educational technology as a catalyst for bringing educational change [13]. The problem according to Newhouse & colleagues is that despite new cognitive approaches to learning such as constructivism, the education system is stuck in the behavioral paradigm of the industrial age. While some teachers cope well with change and enjoy risk taking opportunities, many teachers are reluctant to change. Therefore, Rogers [in 13] states, it is necessary to understand where teachers are in terms of their level of ICT adaption, to understand the obstacles they are confronting. These obstacles include the lack of funding, teacher training, limited time for teacher planning, lack of support or infrastructure, and lack of vision as to what can technology contribute. For ICT to be effectively adopted into school, Newhouse & colleagues [13] continue, planning is vital. The vision, goals and objectives of the technology program must be imbedded in that of the school [Cole in 13].

Beauchamp [1] claims that teachers are facing challenges and opportunities while introducing a new ICT (such as the interactive whiteboard) in the classroom. Despite the benefits to be gained from exploring the new technology [Harris in 1], there is necessary investment in time, effort, new learning and willingness to change existing teaching strategies [Keeler in 1] Therefore, it is not surprising that although teachers may start from the same starting point when using a new technology, it is possible to identify a range of competencies and pedagogic practice. In his findings, Beauchamp [1] distinguishes five stages, as seen in diagram 1, which delineate the transition from beginner to synergistic operator of new ICT using the interactive white board

Diagram 1. Stages delineate the transition from beginner to synergistic operator of new ICT



(IWA) as a demonstration.

Beauchamp [1] reinforces the claim that if schools are to invest in new technological tools, they should also be aware to the investment needed in preparing teachers for their new role, both in terms of technical competence and classroom pedagogy. He also points out the element of time, time to assimilate the lessons learned by teachers into their practice, “until they feel confident in being able to cope with most facets of a program and other features of the technology” [1, p. 346]. However, he mentions, teachers will progress at their own speed and their training requirements will need to be met in a flexible and supportive environment [also Davis, Preston, & Sahin, in 9].

“It does take time for an educator to complete this journey and to develop a vision of what can be done with ICT” [13, p. 43]. Very often this vision is developed first with the personal use of ICT, and later with appropriate professional development providing good models of best practice. [13]

The implementation of technology in schools occurs in one of the two following models [Avidov-Unger and Eshet- Alkalai, in 2]: ‘Islands of Innovation’, which encompasses only part of the educational organization, and ‘Comprehensive Innovation’.

Rogers [in 2] in his ‘diffusion of innovation’ model describes 5 groups of innovation adapters: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%). Blau and Peled [2] found similar results in the field of education in a research conducted in Israel, 2011. They claim that the literature emphasizes the great importance of personal characteristics of teachers, in high levels of technology adaption [Becker, in 2], but there is no proper appreciation as to their viewpoints regarding technology [McCormick & Scrimshaw, in 2], since changes in these viewpoints can help overcoming obstacles in implementing technology in schools [Hew & Brush, in 2]. Blau and Peled [2], also indicate the importance of holding in school, an ongoing training program to support the teachers in effective use of their computers as a tool to create meaningful learning. Finally, Blau and Peled’s [2] research raises the issue teachers complain about, of time consuming preparing

digital materials for the technology based lessons. These findings emphasize the importance of preparing digital materials by content developers.

Hennessy and Colleagues [9] also indicate that there is substantial evidence that if used appropriately, ICT can be an effective tool in supporting teaching and learning. They agree with other researchers mentioned here that since ICT’s introduction into schools does not by itself improve the quality of education, the pedagogical and technical expertise of the teacher is absolutely critical. They too, believe that teacher development is the key to effectively implementing policy and curricula, to using ICT to enhance teaching and learning, and to produce qualified teachers, therefore: “Teachers who lack the chance to develop professionally in the use of modern ICT feel under threat. The relevance of a teacher in the 21st century is determined by their willingness to develop in this way.” [9, p. 42]

Similarly to Newhouse, Trinidad and Clarkson [13], Hennessy and Colleagues [9] claim that ICT is most effectively used as a learner centered tool, instead of within a more traditional pedagogy. Hennessy and Colleagues [9] think that there is also a general inadequacy

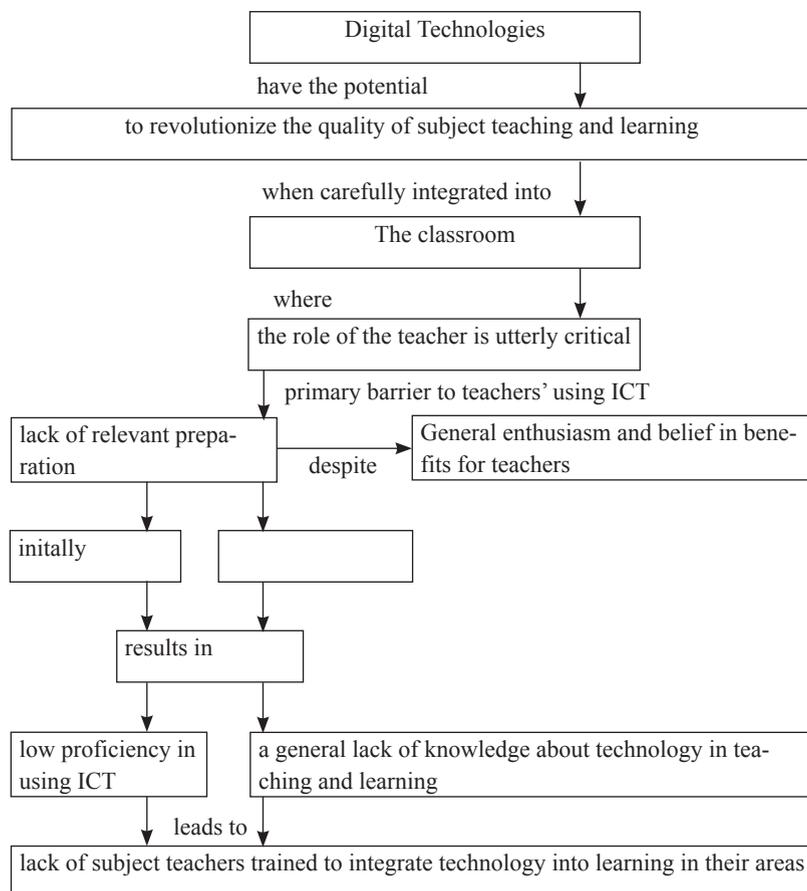


Diagram 2. Problems in implementing ICT in schools

of learning resources, course curricula and other learning materials that involve ICT use, lack of time available in classes, and in teachers' schedules for planning. Therefore, they recommend, national policies need to make more commitment to helping teachers effectively integrate ICTs into the classrooms "by aligning curricula, exams, and incentives with educational outcomes that they hope to gain" [9, p. 43]. They also believe that teachers can take time to discover that ICT does not mean extra work rather it makes their work easier and suggests that more competent learners can be a useful resource for their peers. Hennessy & Colleagues conclusion of the researched that focused on the Sub-Sahara Africa is presented in the following Diagram 2.

Mellar & Colleagues [11] continue the idea, claiming that in order for teachers to be effective in supporting the development of ICT skills and confidence, they should encourage collaborative learning, learner autonomy-so that they will have time to get to know their learners better and adapt their teaching to their learners' need, in addition to using a wide variety of technologies to construct (usually shared) outcomes.

CONCLUSION

In this essay, I discussed the approaches needed to enable effective use of ICT in the classroom and the factors that influence that effectiveness. There is no doubt in the need for external support strategies [9; 14; 3] alongside school level strategies [6; 14; 3]. These must be in correlation with legislative factors [6; 15] that have to take in account additional obstacles for economically disadvantaged areas [3]. The supporting strategies need to be given time for preparation and planning [6; 15; 14; 3]. There is also need for an ICT assistant in school [6; 15; 14; 3], in order to support technology itself [6] and a pedagogy specialist to help integrate ICTs into the curriculum [14; 3]. Students' characteristics should be taken into consideration, as well as the technology-based project [6; 10; 14]. The whole process should then be evaluated in order to reflect the effectiveness (or lack of it) of the technology programs [15; 3]. The central factor, all researchers agree upon, is teachers characteristic-such as leadership [14; 3], and their acquaintance with technological tools [7; 6; 15; 14; 3; 4].

Dresler & Colleagues [5], provide six elements called TARGET to describe the role of teachers in integrating ICT effectively. Beauchamp [1] distinguish five stages delineate the transition teachers go through while using new ICTs in the classroom. Finally, two main solutions are given in order for teachers to use ICT effectively in the teaching-learning process: Teachers professional development in terms of both technical competence and classroom pedagogy [2; 7; 9; 1; 13]. And time for adjustment [2; 5; 9; 1; 13]. Teachers who will encourage

collaborative learning in addition to using a wide variety of technologies will gain time to know their learners and better adapt their teaching to their learners' needs.

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