

# **PEDAGOGICAL SOLUTIONS IN E-TEACHER TRAINING – TOWARDS EFFECTIVE TECHNOLOGY ADOPTION BY TEACHERS**

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**Abstract:** *The question of how to design and implement teacher training in the use of educational technologies is a hot topic which still needs thorough research. The authors describe a case study in which teachers of English from rural areas were recruited, had their needs diagnosed and were trained in the use of technology in language teaching. Afterwards, a sample of the course participants was investigated through observations and interviews in their teaching contexts, in order to see the effect of training on subsequent technology adoption.*

**Keywords:** middle and secondary school education, interactive whiteboards, language teacher training

*You always hope for positive results, but you never know what to expect. I'm happy to show you these results, because they clearly show that technology ... makes a positive impact on learning.*

Robert Marzano <sup>1</sup>

## **INTRODUCTION**

Great efforts have been undertaken all over the world to design and deliver effective training in the use of technology to language teachers. While much has been written

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<sup>1</sup> CEO of Marzano Research Laboratory, presenting his organization's newest research report, titled "Evaluation Study of the Effects of Promethean ActivClassroom on Student Achievement," which details how interactive whiteboards can affect student learning.

on the way training should be designed and implemented, there is still a need for research into actual technology adoption. In other words, studies in which investigators actually attempt to see the effect of trainings on the daily practice of trainees are rather scarce.

The purpose of the present paper is to reflect upon the effect of pedagogical solutions adopted throughout e-teacher training on the actual technology adoption of language teachers. For that purpose, lesson observations and teacher interviews were undertaken with a sample of training participants. The paper reviews previous literature on technology adoption, reports upon the characteristics of the training and gives qualitative data gathered at schools.

## **1. BACKGROUND TO THE STUDY**

### **1.1. Teachers' positive and negative attitudes to learning technologies**

There is a universal belief about the perceived beneficial role of computer technology for the foreign language learning process, as well as the advantages of CALL contexts over traditional, „unplugged“, teaching procedures. In general, the educational computer technology is encountered with much less anxiety than it used to be (see Shi and Bichelmeyer 2007), and the computer had already overcome some of the uncertainties identified previously.

One particularly prominent theme permeating through the investigations into teachers' perceptions of educational technology has been the promotion of constructivist approaches to learning and the development of learner autonomy in computer-mediated contexts. Parker, Bianchi and Cheah (2008) highlight the view of technology as providing enhanced opportunities for student interaction, thus enriching the possibilities for knowledge construction, as one of the fundamental concepts in educational theory. Also Judson (2006) notes that, as indicated by research into teachers' perceptions and practices, those instructors who readily integrate technology into their instruction are more likely to display constructivist teaching styles. Constructivist-minded educators, according to Judson (2006), employ technology to make their classrooms dynamic and student-oriented.

Effective use of computerised language programs provides individualised instruction and immediate feedback as well as facilitates self-instruction (Velazquez-Torres 2006). Teachers believe that the use of computers could be beneficial to language learning, increasing learners' motivation by allowing their own choice of learning materials, adjusting the pace of work and devising individual study paths (Kim 2008). Teachers perceive technology as a factor enabling more effective development of students' language skills, through integrating multimedia and skilfully interweaving a variety of learning technologies in teaching scenarios (Velazquez-Torres 2006). Using computers in the classroom opens up three possible spheres of implementation of computer technology to augment the language teaching process: as a tool (to enable authoring and delivery of resources, individual

tutoring as well as synchronous or asynchronous communication), as a motivator (to provide multimedia, increase interaction and facilitate collaboration) and as an optional tool (Kim 2008).

The prerequisites for technology implementation are ample provision of learning technologies in schools, especially in terms of software and access, and teacher confidence in technology use (Hegelheimer 2006). Those teachers who are more confident about technology and its use are more likely to employ it in innovative ways, while the very technology used does not have to be highly innovative in itself. Experienced teachers who use computers effectively with their students view technology as a means rather than an end to learning (Garner & Gillingham 1996; after Meskill *et al.* 2002), seeing themselves in a largely advisory role (Meskill, Mossop & Bates 1999). Experienced teachers confident in the use of technology welcome newness and variety, seeking constantly to expand their repertoires (Berg *et al.* 1998).

On the other hand, teachers' apprehension of the consequences of incorporating ICT in the language lesson is perceived to be caused by intrinsic factors, such as teacher's computer and media literacy, teaching style, and personality (Gajek 2002), resulting in self-perception as „technopeasants," „technophobes," „resident Luddites," or „stupid about computers" (Jacobsen, Clifford and Friesen 2002). Teachers tend to exaggerate their lack of technical expertise (Krajka 2012), and even though instructors may be fairly competent computer users in their personal, social or professional spheres, they can still be apprehensive about using computers in the classroom, feeling that students might know more about technology than they do, causing them to „lose face" (Chambers and Bax 2006). Thus, according to Marcinkiewicz (1994), teachers' use of computers for teaching is related to their belief in their ability to do so and self-efficacy plays an important part in technology adoption. As Norum, Grabinger and Duffield (1999) report, teachers feel the strong assertion that they need to change personally and take on new roles if technology is to be integrated effectively into their classrooms, seeing themselves as the place where change efforts need to begin.

Another reason for the negative perception of technology-assisted language learning may be the ill-conceived idea of a „CALL" lesson (Chambers and Bax 2006). The common misconception here might be that such a lesson involves placing students in front of computers for an entire classroom period, relying solely on human-computer interaction with no role for the teacher, as well as that using computers in an EFL classroom is not about „learning English" but rather „learning about computers" (Chambers and Bax 2006). Jacobsen *et al.* (2002) observed that teachers, especially those less confident in their ability to use technology for professional purposes, are uncertain about how to augment teaching with technology. Clarification of models of technology use, followed by examples of good practice, might help to prevent such ill-formed visions (see Krajka 2007, 2012, for a detailed overview of curriculum development of Internet-based language teaching). Also poor quality of early CALL programs might have created a negative view of

technology-enhanced teaching for many teachers, who could have experienced such „drill-and-kill“ instruction themselves as learners (Rusiecki 1991, 1993). An unwillingness to prepare digital materials instead of relying on ready-made published resources may be, according to Leffa (2005), a fairly important motivation against teaching with technology.

It is not only the acquired level of computer literacy but also general classroom experience that shapes teachers' attitudes towards technological innovation adoption. Meskill *et al.* (2002) showed that even though the technological training novice teachers received was more state-of-the-art, they were much less comfortable in their technological implementations than more experienced educators who had a lot more classroom experience with no formal CALL training.

## **1.2. Technology adoption by teachers**

Even though the new skills might be effectively acquired as a result of instruction, teachers do not have to become ardent innovation adopters (Langone *et al.* 1998). According to McMeniman and Evans (1998), the reason for this may be lack of perception there is sufficient evidence of positive effects of technology-enhanced teaching in „real life“, and the very real belief of teachers that although technology has an empowering potential it is not enough for them to apply the tool in their classrooms. Thus, instruction that presents “evidence that shows positive effects of the new teaching method on the quality of learning outcomes” and helps “develop expertise in the new method” (McMeniman and Evans 1998: 1) is a necessary step towards effective technology adoption.

The ways that teachers perceive innovation can be multifold, and the three most frequent attitudes are withdrawal conditioned by apprehension of novelty, losing authority or personal safety; reception of innovation only when convinced of low risk and personal benefit; and, finally, ardent adoption and trend-setting, characteristic of creative individuals ready to take risk (Zawadzka 2004). The technology adoption process is to a large extent individualised, conditioned by the teachers' personal characteristics, teaching experiences, administrative considerations, learners' expectations and needs, logistical allowances, etc. The adoption (more commonly referred to as „diffusion“) process is a complex, dynamic continuum, with many factors influencing the change (Dooley, Metcalf and Martinez 1999).

In describing technology adoption by individual teachers, Rogers (1995) suggests that the process consists of five major sequential steps:

1. Gaining awareness of the innovation.
2. Forming either a positive or a negative opinion about the innovation.
3. Choosing to adopt or reject the innovation.
4. Using the innovation.

5. Seeking evidence that supports the decision to adopt or reject the innovation.

The second stage, that of forming a personal opinion about innovation, should lead to „ownership“ or a situation in which those teachers who are more expected to resist innovation will be found more willing to implement it when the innovation becomes „theirs“ (Palmer 1993: 170). This can take place through first experiencing the effects of innovation themselves, then reflecting upon it and subsequently adapting to one’s own particular circumstances and teaching style, finally, evaluating its effect.

### **1.3. Enablers and barriers to innovation adoption**

Even though a great amount of money, effort and time can be expended, instructors may still seem reluctant to integrate technology into their teaching, i.e. being able to use an array of tools to gather information and communicate with others (Abdelraheem 2004). Ertmer (1999) indicates that teachers would not automatically integrate technology into teaching and learning even if barriers such as access, time, and technical support were removed, as the change needs to be implanted in their intrinsic beliefs about teaching as well.

Ertmer (1999) provides a useful distinction into first-order barriers, which include access to hardware, access to software, time to plan instruction, technical support, and administrative support, and second-order barriers, namely the underlying beliefs of teachers about teaching, learning technology, organizational context and unwillingness to change. The former are extrinsic to teachers, environmental (incremental, institutional), and easier to manage and solve, while the latter are intrinsic, personal and fundamental, more difficult to deal with (Abdelraheem 2004).

Other most common barriers to technology integration are as follows:

- poor administrative support, problems with time, access, space, supervision, and operations, poor software, curriculum integration difficulties, teacher’s attitudes towards and knowledge of computers, computer limitations and inadequate numbers of computers and lack of technical support (Hadley and Sheingold 1993);
- access to resources, quality of software and hardware, ease of use, incentives to change, support and collegiality in their school, school and national policies, commitment to professional learning and backgrounds in formal computer training (Mumtaz 2000);
- the instructor’s discipline, lack of time, inadequate equipment and insufficient training (Beggs 2000; Brill and Galloway 2007; Schoepp 2005).

It is interesting to note that the major barriers, according to principal faculties (deans and teacher educators) investigated by Goktas, Yildirim and Yildirim (2009), are

lack of in-service training, lack of appropriate software and materials, and lack of hardware, but not really lack of appropriate course content and instructional programs, lack of time, or lack of appropriate administrative support. Most probably, the perception of high-profile educators would be different from that of teachers, who stress questions of curriculum integration and pedagogical support rather than just technical assistance as key issues to be resolved.

In terms of enablers, Goktas *et al.* (2009) reveal the following factors:

- having at least one computer in every classroom,
- having at least one free laboratory in every school,
- supporting courses with an appropriate webpage,
- offering more ICT-related courses,
- enhancing the motivation of the teacher educators and prospective teachers in regard to using ICTs in their classes,
- designing ICT-related courses based on applicable activities,
- teacher educators being role models for prospective teachers and demonstrating how to use ICTs effectively in teaching.

The preferred teaching style seems to be interconnected with technology adoption. Honey and Moeller (1990) found that teachers with student-centred pedagogical beliefs were successful at integrating technology except in cases when anxiety about computers prevented them from using the technology. In contrast, teachers with more traditional beliefs faced much greater change in their practices in order to integrate technology. For Zapata (2004) the conceptualization of innovation-driven teaching as opposed to „standard“ L2 instruction, as well as general L2 acquisition knowledge, occupy an important role in technology adoption.

## **2. THE STUDY**

### **2.1. Aims and assumptions of the instructional module**

Striving towards effective ICT teacher development means the consideration of enabling factors in the two contexts, at university and at school. On the one hand, effective ICT teacher training needs to be grounded in the practical reality of the learning environment student teachers are educated at. At the same time, at least rough consideration of what possible enablers might be encountered at school needs to be implanted by the instructors for teachers to properly design and implement computer-based methodology.

Therefore, during 2014 SWPS (University of Social Sciences and Humanities) EU sponsored language teacher training, the total of 64 hours were devoted to the theory and practice of technology usage in the foreign language classroom. The aims of the

workshops were to acquaint participants with the methods and techniques of joining the traditional and IT-supported styles of language teaching in the primary, middle and high schools, in particular:

- to present and train the usage of various digital technologies in order to develop digital competence and communication in foreign languages;
- to gain a better understanding of a variety of aspects involved in the process of teaching languages with technology;
- to collect a wide repertoire of technology-assisted tools, techniques and activities;
- to prepare participants to be able to select, adapt and create ICT-based ELT materials to suit learners' needs and abilities;
- to provide students with critical and analytical skills that will help them conduct a comparative evaluation of different teaching methods and language teaching materials. ("Program szkolenia," 2013)

A lot of effort and time was devoted to practical activities, peer teaching, group discussion and evaluation. In effect, the training has successfully motivated teachers to use technology-based teaching in their work. In fact, three participants from one of the best schools in the Mazovian district invited the trainer to observe in practice the effects of the training, which resulted in a very valuable and rewarding follow-up experience.

## **2.2. Participants**

### **2.2.1. Participants of the e-teacher trainings**

The 2013-14 SWPS EU-funded training courses were addressed at primary and junior secondary foreign language teachers from the rural areas of the Mazovian district. The participants ranged greatly in age and teaching experience, as well as their familiarity with ICT tools. Each of the six groups was highly heterogeneous in terms of languages taught, age and teaching experience, as well as willingness to teach with technology.

Before the beginning of the classes, they were asked to complete a diagnostic test ("Test Diagnostyczny," SWPS 2015). The tests' close analysis reveals that although 43 respondents out of 73 training participants used mail services, social networks, MS Office tools on daily basis, the usage was limited to the basic and social functions. In fact, about 50% of the respondents answered that they did not know how to use editing, review tools to adjust the text or the image. Moreover,

- 41.86 % did not use Google tools and 76.74 % did not use them for teaching purposes
- 95.35 % did not use Internet blogs for teaching
- Yet, 79.07 % used online dictionaries

- Only 9.30 %) used podcasts and screencasts

All in all, 73 participants were trained in six editions of the EU sponsored SWPS e-teacher training. Among them, three teachers from the Sikórz complex of non-public Catholic schools.

### 2.2.2. Selected sample of trainees for post-training study

Sikórz based (a small town near Płock) complex of middle and high school is a highly modern and successful educational institution in the Mazovian district. It is a beautifully located boarding private school. However, neither location (countryside) nor costs make this institution an isolated island on the Polish educational market. Its long and prestigious history, outstanding middle and high school exams results (Table 1), renown and standards, friendly and motivating atmosphere, modern approach to teaching make it attractive for pupils not only from the neighboring villages, towns, cities (the school transportation is very efficient) but also from the two-hour-drive Warsaw.

**Table 1.**

**Sikórz 2014 Middle School exams**

	Mazovian average %	Poland average %	Sikórz average %
English- basic	70.1	67.0	83.2
English- advanced	49.5	46.0	67.8

*Source: [online] at <http://www.liceumkostka.pl/index.php/wyniki-egzaminu-gimnazjalnego>, (accessed on 8 August 2015)*

The school and its teachers are open to new challenges and opportunities; thus, they participate in a variety of projects (e-Twinning, student exchange, etc.), field trips and trainings. The school is equipped with seven interactive boards, a computer room and even a radio studio. The biggest asset are the teachers who want to learn and are open to the world, including technological challenges. It was a privilege and a very rewarding experience to be invited by all three language teachers working there to observe their real-life teaching and to be asked to provide them with the feedback and further support.

### 2.3. Instructional procedures

The major assumptions of the e-teacher training used to prevent negative perceptions of participants and maximise their technology adoption were as follows:

- technology integration needs to involve teachers in observing models of integrated technology use, viewing examples of good practice, reflecting upon and discussing ideas with mentors and peers (Ertmer 1999);

- less independent teachers need more technical support on the basic level as well, while a more sophisticated technology integrator will need both more advanced technology support (due to the exploitation of more sophisticated solutions) and more advanced professional development (Rogers 2000);
- guidance from more advanced technology integrators on how to create the technology-assisted curricula ought to be provided (Schoepp 2005);
- conceptual support should be given in the form of templates or checklists (similarly to WebQuest's matrix, <http://webquest.org>, or the TalenQuest model, <http://webquestmaker.nl/zoeken/talenquest> - Krajka 2012);
- effective collaboration among teachers helps to try out ideas and receive peer feedback on pedagogical value of innovative activities (Ertmer 1999);
- greater instructional impact is achieved if the ways of analyzing, evaluating, and grading English language arts technology projects are provided (Pope and Golub 2000).

These assumptions were implemented throughout the 64-hour on-site training, divided into the following modules:

- introduction to teaching with technology
- text-based tools in language teaching
- audio-based tools in language teaching
- video-based tools in language teaching
- designing and implementing interactive quizzes
- individualising technology-based instruction to fit different age groups
- managing a Moodle platform
- psychological, ethical and legal aspects of technology-based teaching.

## **2.4. Results and findings**

### **2.4.1. Lesson observations**

The lesson observation took place in both the middle and secondary of the Sikórz non-public Catholic schools complex. It can be concluded that middle school learners work more effectively with the IWB than high school learners: everyone is active and eager to work with the board. Teachers design extra materials to introduce the elements of culture, to be able to use authentic material, to individualize and personalize tasks. They do not refrain from departing from the coursebook, to insert humour in order to boost learners' motivation. During some other classes, the teachers skillfully use the pdf or digital version of the coursebook (Figure 2). It has to be noted that although the teachers in question had had experience with IT in the classroom, the SWPS training (as they admitted

themselves and can be clearly observed) gave them more confidence and skills in the IT usage for teaching purposes. They admit using Google drive, more IWB tools than before, designing Hot Potatoes quizzes, uploading and editing films on YouTube. The training also contributed to the school cooperation with the foreign partners in the e-Twinning program. In addition, one of the respondents claims that the training changed her attitude towards looking for new opportunities and challenges.



**Figure 1. Sikórz post-training lesson observation (2015)**

It has to be noted that in Poland, although more and more schools are equipped with IWBs, their availability is still conditioned by school's lack of financial resources or teachers' lack of training. In some schools there are a few boards, but in some there are none. Moreover, in some schools IWBs are still supervised by IT teachers or rarely used because of the principals' worries as to the proper usage of this expensive equipment. Therefore, it is very important that both teachers and school principals understand the need to be engaged in the process of looking for new opportunities, training, projects, competitions that will result not only in financing the equipment but also in proper teacher training.

#### **2.4.2. Follow-up interviews**

The feedback gathered from the interviews with teachers participating in the SWPS training suggests that Polish language teachers feel the need to learn how to use technology in the classroom because their schools participate in e-projects; they

want to respond to their students' needs and expectations; they are creative; they have an option of using the digital version of the coursebook or they want to design their own digital materials, for example as there are "gaps" in the paper-based coursebooks (Gadomska 2015). "[When looking] at the ways of using the Web for entertainment and study, it is clearly visible that Poland, together with other new EU countries, is situated above the EU-27 average as regards all purposes of Internet use. A significant number of Polish Internet users (around 40%) report online learning. When combined with high percentages of users of social networking portals sharing multimedia online, this creates appropriate conditions for multimedia-based online learning..." (Gadomska, Krajka 2015: 148).

The SWPS training participants (Sikórz teachers) were asked the following questions (a follow-up questionnaire):

1. How does the training help you in your everyday work?
2. Do you design your own teaching materials? Do you use student feedback to adjust your materials?
3. Do you use your own materials because of class needs, course book gaps/ lack of high-culture material, intercultural elements?
4. What are your pupils' attitudes towards IT usage?
5. How often do you use IT in the classroom?
6. For what activities do you and your learners use IT?
7. Do you use social websites to communicate with your learners ?
8. How do you rate ready-made/ publishers' IT based materials?
9. What are the main interests of your learners (group characteristics)?
10. Is IT a guarantee for a successful activity/lesson?
11. Student behaviour / class management / special cases and the effectiveness of IT-based materials- do you see any correspondence?
12. How do you assess IT competence of your learners?
13. Do you observe learner autonomy or/and self-study skills development because of IT training?
14. How does IT in the classroom or outside the classroom change the relationship teacher vs. learner?

Sikórz teachers answered that they have become more self-confident as a result of training. However, the training should be repeated from time to time (updating information, refreshing memory). They report using more IWB tools than before; the training has enabled project work and cooperation with foreign schools. Moreover, they are able to design their own materials and use authentic materials (which stimulates discussion, is highly motivating, involves the intercultural

context). IT usage helps them improve class management, keep learners focused. It also helps learning about learners' needs, interests, hobbies, etc. (Figure 2).



**Figure 2. Sikórz post-training lesson observation. Individualizing the learning process by the use of personally relevant material. IWB tool: the curtain- used to boost student alertness**

Teachers claim that they have observed that learners memorize vocabulary better in general or memorize words they select ("the ones I would have never suspected"). Many teachers refrain from using technology in the classroom because they are afraid of losing their credibility as learners' IT skills are higher than their own. However, proper training and readiness to engage the learners and to treat them as IT authorities, results in boosting learners' self-confidence and in effect their motivation. One of the respondents said: "I rely on learners' competence although I try to manage on my own and master new skills." The ability to design teacher's own digital materials enables introducing cross-cultural context, especially to use online material addressed at the Polish audience for English learning activities (elements of the Polish culture introduced), a "gap," characteristic of many materials offered by renowned publishers (Gadomska 2014).

At this point, it must be stressed that the post-training visit was both the trainer's and teachers' initiative. All three teachers from Sikórz are extremely professional, engaged and enthusiastic about the schools modern and student-friendly approach to teaching. It is invaluable that trainees understand and appreciate the post training visit, a visit that not only verifies the training's results but also gives them follow-up back-up, which they make use of in their work. The activities planned for the lesson observation demanded from teachers skillful usage of a variety of IT skills, in particular IWB technology and creativity.

## CONCLUSION

Many teachers who use technology in the classroom complain about technical problems or lack of IT specialist support. It is essential that teachers know the limitations of the medium and the methods and tools used to adapt a given activity in case of technical problems. It is also crucial that teachers should choose between the traditional and IT-supported methods and set proper pedagogical priorities. Technology creates a “wow” factor and can be a highly attractive teaching tool; yet, it may also ruin the lesson if something goes wrong. The respondents concluded that although IT in the classroom is not the only guarantee of teaching/learning success, it can be a decisive factor.

As the present study indicates, the awareness of technology adoption process together with enablers and barriers is essential in the process of designing e-teacher training courses. Making participants able to adapt particular technology-based activities or techniques to suit their contexts is an important part of the flexible training philosophy. While first-order barriers (Ertmer 1999) such as provision of hardware and software are becoming less and less prevalent, much greater pedagogical effort is needed to remove second-order barriers such as teachers’ unwillingness to change their practices. Most importantly, underlying beliefs of teachers about teaching, learning technology and organizational context need to be shaped throughout the training and afterwards, so that participants develop their personal philosophy of how to teach with or without technology.

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