Measuring School Principals' Support
for ICT Integration in Palermo, Italy

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Abstract

School principals play an important role in managing media and technology integration into school teaching since they can foster the use of information communication technologies (ICT) at a strategic level, even supporting the introduction of media literacy education activities into teaching. Starting from a review on the role of principals' attitudes and behaviors as facilitators of ICT integration into school teaching using a diffusion of innovation model, the paper investigates the role of principals' attitudes and additional variables in influencing their support for such integration. The paper reports on data collected from 116 public schools in Palermo (Italy), where the supportive behaviors of 95 principals were investigated through a self-assessment questionnaire in 2006. Findings reveal that principals' support for ICT integration behaviors depend on both contextual-level and individual-level variables. Contextual variables include the amount of ICT equipment available for teachers in their school, teachers' competence and frequency of use and teachers' attitudes towards the ICT usage. Individual-level variables includes principals' attitudes towards ICT integration into school teaching, their exposure to ICT training courses and their own perceptions of their competence in using ICT.

Around the world, scholars have noted that the integration of information and communication technologies (ICT)[1] into school teaching has become a key issue in education since the early 1990s (Pelgrum 1993). Since the challenge of technology integration into education is more cultural than technological (Sheingold 1991), countries have the responsibility not merely to provide computers for schools, but also to foster a culture of acceptance amongst the end-users of these tools (Albirini 2006), whether they are teachers or students. Indeed, according to previous research on the adoption of technological innovation, the intention to use any technological system is influenced by the potential users' level of acceptance of it (Davis 1986; Davis 1989; Davis et al. 1989). As Albirini (2006) argued, "the successful implementation of educational technologies depends largely on the attitudes of educators, who eventually determine how they are used in the classroom" (375).

Principals play an important role in leading ICT integration into school teaching (Dawson and Rakes 2003; Mulkeen 2003; Pelgrum 1993; Tondeur et al. 2008), because they can foster the use of ICT at a strategic and action level (Baylor and Ritchie 2002), even supporting the introduction of media literacy education activities into teaching (Polizzi 2009a), with media literacy education being conceptualized as the use of the old and new media as both technical tools and subjects within school teaching.

In this paper, I present a review on the role of principals' attitudes and behaviors as facilitators of ICT integration into school teaching as an example of innovation diffusion process (Rogers 1995). Then I describe the methodology and results of a study conducted in 116 public schools in Palermo, Italy, where the supportive behaviors of 95 principals were investigated through a self-assessment questionnaire in 2006 (Cappello 2009; Siino 2009a; Siino 2009b). The question addressed in the paper is what variables are associated with principals' supportive behaviour for ICT integration into school teaching. In this regard the starting hypotheses of the paper posit that such behaviour depends on both *individual-level variables*, such as principals' attitude towards ICT integration into school teaching; principals' attendance at ICT training courses; and principals' ICT competence and frequency of use; and *contextual-level variables*, such as the amount of ICT equipment available for teachers in their

school; teachers' ICT competence and frequency of use; and teachers' attitudes towards the ICT usage within school teaching.

Literature Review

Integrating ICT into teaching: Diffusion of innovation approach

The integration of ICT into school teaching can be considered and studied as an example of what Rogers (1995) called the *diffusion of innovation*. Innovation can be defined as "an idea, practice, or object that is *perceived* as new by an individual or other unit of adoption. [...] The characteristics of an innovation, as *perceived* by the members of a social system, determine its rate of adoption" (Rogers 2002, 990; my italics). Diffusion is the process through which an innovation is communicated through certain channels over time among the members of a social system (Rogers 1995). Five stages can be distinguished within the *innovation-decision process* at individual level: (1) the knowledge of the innovation; (2) the attitude toward the innovation, which can be expressed – for instance – along the continuum from the minimum interest to the maximum interest; (3) the decision to adopt or reject the innovation, based on a previous evaluation of its main attributes; (4) the implementation of the innovation, consisting in the first use of it, and (5) the confirmation of such first use, resulting in the lasting adoption of the innovation over time.

For the purposes of this paper, the main lesson that can be drawn from the framework proposed by Rogers is that any *innovation-decision process* at the individual level is influenced by two elements: the perceptions of the characteristics of the innovation and of their relative importance; and the attitudes towards the possibility of adopting such innovation (attitudes deriving from the perceptions previously formed and, at the same time, affecting the successive perceptions formation).

Such considerations are explicitly supported by another influential research stream on innovation adoption, originally proposed by Davis (1986; 1989; Davis et al.1989) and known as Technology Acceptance Model (TAM). Such a model is an extension of the Theory of Reasoned Action proposed by Fishbein and Ajzen (1975) to explain and predict the behaviors of people in a specific situation. According to this theory, the behavior of an individual depends on his/her intentions, and such intentions derive from his/her attitudes toward behavior and his subjective norms. Starting from such theoretical framework, Davis et al. (1989) argue that the intention to use any technological system is influenced by two other relevant factors: perceived ease of use and perceived usefulness.

Three considerations can be derived from a review of this literature: perceptions influence attitudes; these attitudes then affect the behavioral intention to use a technological system; such intentions influence actual technology use. In other words, because adopters' perceptions and attitudes are some of the most important variables for explaining any innovation-decision process, technology implementation plans for schools require their adopters to hold favourable attitudes towards their introduction. Teachers and principals represent influential adopters of ICT at school, since through their attitudes and behaviors they are able to introduce innovations both into their way of teaching and into students' way of learning.

When ICTs are integrated into teaching, they can be used (1) as *tools* for school teaching, in terms of *technical instruments* supporting student learning; or (2) as *subjects* within school teaching, in terms of the *content* of student learning. These two types of activities involving the use of the media can be defined, respectively, as teaching through the media and teaching about the media (Buckingham 2003). An example of teaching *through* the media is the use of television as a mean for teaching traditional subjects as science or history, or the use of the cassette recorder and, more recently, the CD player for teaching foreign languages, whereas teaching *about* the media includes activities targeted at developing the students' ability to read and write the media, respectively, in the terms of critical analysis and creative production (Cheung 2009). In a strict sense, teaching about the media is commonly considered the core of media education (Buckingham 2001), which is also known as media literacy (Hobbs 1998).

Many sorts of media and technology activities in the classroom have increased as a result of the spread of ICT around the world. Mokhtar (2005) pointed out that the implementation of IT policies brought about reforms in the education system. These reforms include "new learning scenarios, from passive learning to active, critical and analytical learning; new expectations on teachers, in terms of IT competencies; and new roles that teachers must assume, from knowledge-dispensers to knowledge-guides and creators" (Mokhtar 2005, 28).

As Park and Biddix (2008) claim, numerous researchers share the idea that digital media education should pursue the following aims: (1) awareness of both the potential and the dangers of digital media in everyday life; (2) hardware/software access, in terms of material equitable access to and utilization of digital media; and (3) digital skills, which are within the scope of media education. According to Park and Biddix (2008),

> Digital skill is believed to be central to helping youth make the most of the benefits arising from technological innovation, while concurrently leading to more informed judgments regarding content and usage in cyberspace. Aspects of digital media skills include: technical literacy, informational literacy, and communication literacy, which should be viewed as complementary skills (Park and Biddix 2008, 105).

The adoption of educational innovations by teachers consisting of teaching through and about the media needs to be supported by school principals, with teaching about the media requiring more targeted strategies to be planned by principals than teaching with the media does (Cappello 2009). In both cases, however, principals can play a strategic role in leading ICT integration into school teaching, as discussed in the next section.

The role of school principals in integrating ICT into teaching

An increasing number of scholars agree that leadership plays a major role in ICT implementation at schools, especially in its integration into the curriculum (Cuban 1986; Dawson and Rakes 2003; Mulkeen 2003; Pelgrum 1993; Tyack and Cuban 1995; Tondeur et al. 2008). As Pelgrum (1993, 200) stated, "Amongst other things, attitudes of school principals play a role in determining to what extent computers are used." The attitudes of participants who are involved in an educational innovation play a role in determining to what degree and with what speed change will be effected (Fullan et al. 1988). Pelgrum's research showed that principals with very positive attitudes towards the usage of computers tended to influence their teaching staff by emphasizing the importance of computer-integrated learning.

According to Merkley et al. (1997), ICT training received by teachers is not sufficient to an effective ICT integration in the curriculum if teachers are not supported by the leadership of their school principals. A research stream specifically focused on the role of school technology leadership in educational reforms has been developing over the last years (for further details, see Akbaba-Altun 2004; Anderson and Dexter 2005; Creighton 2003; Flanagan and Jacobsen 2003; Fullan 2002; Hamzah et al. 2010). In this direction, results from a literature review by Akbaba-Altun (2004, 257) suggested that principals "are expected to display active leadership in any kind of innovation at school level, including technological changes in the process of teaching and learning [...] Consequently, it is inevitable for school principals to have new roles as IT classrooms increase."

Policy makers and school principals can plan and support the participation of teachers in integration-focused training activities, whose impact on the overall usage of ICT in subject teaching is stronger than the impact of basic ICT skills courses (Mulkeen 2003). Such results are consistent with the ones by Pelgrum (1993), who claimed that the amount of information teachers received in training courses about pedagogical/instructional aspects of using computers is quite strongly associated with their attitudes about the educational impact of computers. Since the use of ICT by an individual can be encouraged by training, scholars note that school principals should be provided with ICT training specifically targeted at technology integration into the curriculum. With respect to this issue, Dawson and Rakes (2003) found evidence that technology integration into the classroom is influenced by the type and the amount of technology training received by principals. In the same direction, Serhan's (2007) research further confirmed that principals' positive attitudes towards the introduction of ICT in the classroom can be fostered by technology training for school leadership, since

> when school principals feel comfortable using the technology and realize its possible applications in education then they can help facilitate its incorporation into the curriculum. A positive attitude starting from the school leadership can spread to the teaching faculty in the school and hence to the classroom and the students. Training workshops help raise school principals' awareness and build their confidence in their abilities to use technology and therefore facilitate its adoption as a complementing part in the curriculum (Serhan 2007, 46).

Research by Tondeur et al. (2008) emphasized the role of local school policies in ICT integration from a school improvement approach and identified five policies that required an active intervention by school principals, namely: the presence of an ICT policy plan, leadership supporting the process of ICT integration, school internal support, evaluation of ICT use, and between-school cooperation (for further details see Tondeur et al. 2008, 214–215). In addition, these scholars stress the impact that teachers' perceptions of ICT school policies can have on ICT integration in the classroom.

      Policy makers and school leaders can foster the increase of ICT equipment in schools. For example, Mulkeen (2003) found a correlation between the amount of ICT equipment at primary schools and the overall usage of ICT in subject teaching. As a consequence, when school principals increase the amount of ICT equipment in schools, they can indirectly support an increase of media and technology usage in the classroom. Based on this review of the literature, six main research hypotheses examine some of the variables that may be associated with principals' supportive behaviors for ICT integration into teaching:

- *H1*. Principal support for ICT integration into teaching is associated with his/her attendance at ICT training courses, in the sense that principals having attended ICT training courses are expected to give stronger support than principals without any past attendance.
- *H2*. Principal support for ICT integration into teaching is associated with his/her ICT competence and frequency of use, in the sense that principals with higher levels of ICT competence and frequency of use are expected to give stronger support than principals with lower levels.
- *H3*. Principal support for ICT integration into teaching is associated with his/her attitude towards such integration, in the sense that principals with positive attitudes are expected to give stronger support than principals with negative attitudes.
- *H4*. Principal support for ICT integration into teaching is associated with the amount of ICT equipment available for teachers in his/her school, in the sense that principals working in schools with a larger amount of ICT equipment are expected to give stronger support than principals working in schools with a smaller amount.
- *H5*. Principal support for ICT integration into teaching is associated with teachers' ICT competence and frequency of use, in the sense that principals

working in schools where teachers already have higher ICT competence and frequency of use are expected to give stronger support than principals working in schools where teachers have lower ones
- *H6*. Principal support for ICT integration into teaching is associated with teachers' attitudes towards such integration, in the sense that principals working in schools where teachers already have positive attitudes are expected to give stronger support than principals working in schools where teachers have negative attitudes

Research Methodology

      This research is a secondary data analysis of research originally aimed at examining the attitudes and behaviors of teachers, ICT coordinators, and principals in all public schools (N = 170) existing in Palermo, Italy in 2006[3]. As the capital of Sicily, more than 600,000 people (primarily of Sicilian descent) reside in Palermo. The overall scope of this research was to collect data about the general state of ICT integration into school teaching in Palermo, as a preliminary source of information for conducting future in-depth research on attitudes and behaviors of different stakeholders (principals, teachers, families and students).

Sample

      There are a total of 145 school principals in Palermo[4]. However, only 67.6% of principals agreed to take part in the research. As a result, this study included school leaders from 116 schools. Three principals refused to be involved into the research, although they allowed the research team the opportunity to access their schools for identifying two different aspects of ICT integration into teaching: the ICT equipment available for teachers, as reported by ICT coordinators through a self-administered questionnaire; the level of ICT integration in the classroom, as reported by teachers through a self-administered questionnaire. Ninety-five school principals agreed to participate in the research, according to the following distribution: 33.7% in primary schools, 22.1% in middle schools, 23.1% in secondary schools and 21.1% in comprehensive schools. Principals filled in a self-administered questionnaire. The questionnaire included 107 multiple-choice questions and one open-ended question. Besides other aims, the questionnaire, which was validated by means of pre-testing on ten principals, examined the variables described below.

Principals' support for ICT integration into teaching.

Four dichotomous questions asked principals to report the presence/absence of the following four types of ICT training courses that principals had provided their teachers with: (a) basic ICT skills courses; (b) advanced ICT skills courses; (c) ICT skills courses for getting the European Computer Driving Licence (ECDL); (d) ICT courses in media analysis. Whereas the first three types of courses can be supposed to be primarily targeted at supporting teaching *through* the media, the fourth one can be considered as a way of fostering teaching *about* the media in the classroom. The presence/absence of the four types of ICT training courses was checked by means of four dichotomous variables indicating the absence or presence of each type of training. For each principal the scores on the four training courses were aggregated by sum into a variable identified as *principal's support for ICT integration into teaching* (hereafter, *principal's support*). As a consequence, *principal's support* is expressed through an ordinal variable, where zero indicates no support for training and four indicates the maximum variety of training opportunities.

Principals' attitudes towards ICT integration into teaching

Ten multiple-choice questions asked subjects to report their own positive or negative perceptions of ICT usefulness for school teaching. Sample items include statements about the usefulness of ICT for school teaching that principals could agree or disagree with on a 4-point scale (from *totally agree* to *not agree at all*). Principals' attendance at ICT training courses. One single item asked subjects to report how they had approached the use of computer (*by a training course*, *by friends' aid*, *self-taught person*, etc.).

Principals' ICT competence and frequency of use

Sixty-seven multiple-choice questions asked subjects to report their own perceptions of their ICT competence and frequency of use both at home and within their work environment. Sample items include the number and types of software that principals were able to use, the frequency of use of software within a working week, etc.

Amount of ICT equipment already available for teachers in the school

These items were gathered from a self-administered questionnaire to ICT coordinators. Sample items include the number of computers and other ICT technologies teachers could use in the school.

As mentioned before, teachers (n = 448) also participated in the research and completed a different self-administered questionnaire[5], which, besides other aspects, focused on the following two dimensions:

Teachers' ICT competence and frequency of use

Sample items include the number and types of software that principals were able to use, the frequency of use of software within a working week, etc.

Teachers' attitude towards ICT integration into teaching

Sample items include statements about the usefulness of ICT for school teaching that principals could agree or disagree with on a 4-point scale (from *totally agree* to *not agree at all*).

The research hypotheses here tested posit a relationship between *principal's support*, identified as the response variable, and the remaining six variables listed above, considered as its predictors. Such predictors can be classified as school principal *individual-level variables* or *contextual-level variables*. School principal *individual-level variables* include the following three: principal's attendance at ICT training courses; principal's ICT competence and frequency of use; and principal's attitude towards ICT integration into teaching. School principal *contextual-level variables* include the remaining three: amount of ICT equipment already available for teachers in the school; teachers' ICT competence and frequency of use; and teachers' attitude towards ICT integration into teaching. With the exception of principal attendance at ICT training courses, which was measured through a single dichotomous variable, the remaining five predictors were built through the aggregation of more variables, most of which being ordinal and consequently being aggregated through the method of summated ratings (Likert 1932).

Data Analysis, Results and Discussion

A logistic regression model was used to identify whether and how the six predictors influence *principal's support*. A limitation of this study is that it was not possible to fit a unique 7-variables model (one response and six predictors), because of the small number of

school principals units included in the research (n = 95). Consequently, data analysis did not adopt an *inferential* approach but a *descriptive* one. For such reason standard errors and other values that are typical of the inferential approach are not reported in this paper. In order to make data processing and interpretation easier, both response and predictor variables were dichotomised.

Table 1: Individual-level and Contextual Variables

MODEL 1	Individual-level variables
	(A) Principal's support for ICT integration into teaching
	(C) Principal's attendance at ICT training courses
	(D) Principal's ICT competence and frequency of use
	(D) Principal's attitude towards ICT integration into teaching
MODEL 2	**Contextual-level variables**
	(A) Principal's support for ICT integration into teaching
	(E) Amount of ICT equipment available for teachers in school
	(F) Teachers' ICT competencies and frequency of use
	(G) Teachers' attitudes towards ICT integration into teaching

Two different logistic regression models with *principal's support* as the response variable were built and studied separately. Model 1 includes the individual-level variables, whereas Model 2 contains the contextual ones. Both model 1 and 2 fit data very well, as the low Pearson chi-squares values in Table 2 suggest. Table 3 reports parameter estimates (β) and odds ratios, $\exp(\beta)$, between the response variable, *principal's support for ICT integration into teaching* and six predictor variables. Based on the interpretation of odds ratios $\exp(\beta)$, I tested the six research hypotheses.

Table 2: Goodness-of-fit statistics for Models 1 and 2

	Model 1		Model 2	
	Value	Df.	Value	Df.
Likelihood ratio	0.652	4	1.783	4
Pearson chi-square	0.650	4	1.811	4

Hypothesis one stated that principals who had attended ICT training courses tend to give stronger support for ICT integration into teaching than principals without any past attendance do. Research findings support such hypothesis, $\exp(\beta A_1 B_1) = 1.504$, so showing that principal's support for ICT integration into teaching is associated with his/her attendance to ICT training courses. Such result is consistent with the one from Dawson and Rakes' research (2003), who found that technology training received by principals influenced ICT integration into the classroom. In the same direction, this result is consistent with the one from Serhan's (2007) research, who pointed out that technology training for school leadership is able to foster principals' positive attitudes towards the introduction of ICT in the classroom.

Table 3: Predictors of Principal's Support for ICT Integration into Teaching

	Model 1		Model 2	
Predictors	B	Exp(β)	β	Exp(β)
Principal's attendance at ICT training courses	$\beta^{A_1 C_1} = 0.408$	1.504		
Principal's ICT competence and frequency of use	$\beta^{A_1 D_1} = 0.286$	1.331		
Principal's attitude towards ICT integration into teaching	$\beta^{A_1 B_1} = 0.397$	1.487		
Amount of ICT equipment available for teachers in the school			$\beta^{A_1 E_1} = 1.166$	3.209
Teachers' ICT competence and frequency of use			$\beta^{A_1 F_1} = 0.860$	2.363
Teachers' attitude towards ICT integration into teaching			$\beta^{A_1 G_1} = 0.039$	1.040

I also found support for hypothesis two, which stated that principals with higher levels of ICT competence and frequency of use tend to give stronger support for ICT integration into teaching, $\exp(\beta^{A_1 C_1}) = 1.331$. This result is consistent with similar results from previous research (Albirini 2006; Polizzi 2009b; Venkatesh et al. 2003), which showed that individuals with higher levels of competence and frequency of use of a technological system have more positive attitudes towards its uses.

Hypothesis three stated that principals with positive attitudes towards ICT integration into teaching give stronger support for such integration than principals with negative attitudes do. As Table 3 shows, the research results support the hypothesis, $\exp(\beta^{A_1 D_1}) = 1.487$, and are consistent with the ones from previous

studies (Albirini 2006; Rogers 1995; Davis et al. 1989), which showed that attitudes affect the behavioral intention to use a technological system (or to make other people use it, as in the case of school principals). I also found support for hypothesis four, which stated that principals who can benefit from a larger amount of ICT equipment available for teachers in their school tend to give stronger support for ICT integration into teaching, $\exp(\beta^{A_1 E_1}) = 3.209$. Such result is consistent with similar results obtained by Mulkeen (2003) as well as from the present research carried out on teachers in Palermo (Polizzi 2009b), which found that ICT integration into the classroom is more frequent when teachers can benefit from an higher availability of old and new media in their schools. Hypothesis five stated that principals who manage schools where teachers already have higher ICT competence and frequency of use give stronger support for ICT integration into teaching. Research results support such hypothesis, $\exp(\beta^{A_1 F_1}) = 2.363$ and are consistent with similar results obtained from the research carried out on teachers in Palermo (Polizzi 2009b), which found that teachers with higher ICT competence and frequency of use tend more to put ICT integration into the curriculum in practice, and such behaviors can reinforce principals' support for ICT integration into teaching, so creating a virtuous circle between teachers' competence and principals' supportive behaviors.

Finally, I hypothesized that principals' supportive behaviors were associated with teachers' attitudes towards such integration. However, results show that principal's behaviour seems to be independent from teachers' attitudes towards ICT integration into teaching, $\exp(\beta^{A_1 G_1}) = 1.040$. Such result controverts hypothesis six claiming that principals' support for ICT integration into teaching is associated with teachers' attitudes towards such integration. In other words, there is no relationship between teachers' attitudes towards ICT integration in teaching and principals' supportive behaviors. A preliminary explanation of such a result to be further investigated by future research could be that teachers' visible behaviors (as corresponding to the tangible ICT uses they make in their schools) are more effective in influencing principals' supportive behaviors than teachers' attitudes. After all, teachers' attitudes have a lower level of "observability" than behaviors, as seen from a principal's eyes.

By comparing the odds ratios reported in Table 3, it can be noticed that two contextual-level variables, such as the amount of ICT equipment available for

teachers in their school and teachers' ICT competence and frequency of use, have bigger influence on principals' support for ICT integration into teaching than individual-level variables. In particular, individual-level variables such as principals' attendance at ICT training courses and principals' attitudes affect their supportive behaviors more than principals' ICT competence and frequency of use do. Finally, teachers' attitudes seem to have little or no influence on principals' supportive behaviors.

Conclusions and Recommendations for Future Research

The questions addressed in this paper examined a range of variables which may affect principals' support for ICT integration in schools. The starting hypotheses of the paper posited that such support depends on both *individual-level variables* such as the principal's attitudes towards the use of ICT within school teaching, their participation in ICT training courses, and their own perceived levels of ICT competence and their frequency of using technology, and *contextual-level variables* such as the amount of ICT equipment available for teachers in their school, teachers' self-reported ICT competence and frequency of use, and teachers' attitudes towards the use of ICT within school teaching.

Data analysis showed that two contextual-level variables, such as the amount of ICT equipment available for teachers in their school and teachers' ICT competence and frequency of use, have the biggest influence on principal's supportive behaviors. However, further research should examine whether and to what extent principals' supportive behaviors can be an antecedent of such factors and not simply an effect of theirs. Individual-level ones seem to be less relevant in affecting their supportive behaviors as compared to contextual-level variables; in particular, variables such as principal's attendance at ICT training courses and principals' attitudes affect their supportive behaviors more than their own ICT competence and frequency of use do.

Finally, in spite of the starting expectations, teachers' attitudes seem to have little or no influence on principal's supportive behaviors. Additional studies should identify whether and to what extent teachers' attitudes are influenced by his/her supportive behaviors. Further research is needed to explore some key issues that emerged from data analysis. One relevant issue concerns the features of both the past ICT training courses organized by principals for their teachers and

the courses they plan for the future. In particular, since ICT integration-focused training courses has a stronger impact on the overall usage of ICT in subject teaching than basic ICT skills courses have (Mulkeen 2003), the key question to address should be to whether the types of training courses school principals in Palermo had provided actually targeted ICT curriculum integration. Since both teachers' and principals' ICT competence and frequency of use seem to have a role in fostering principals' supportive behaviors for such integration, future studies should be focused on identifying the current ICT competence of both teachers and principals. In this regard such studies should detect the major obstacles in integrating technology into the classroom in order to highlight specific training needs and assist with planning subsequent ICT training interventions.

This research shows the importance of ICT training received by principals. For such reason, further studies should aim at identifying the specific characteristics of ICT training received by principals to determine the extent to which such training addresses ICT curriculum integration. Since principals' positive attitudes can affect their supportive behaviors, another important issue should deal with the ICT-related roles of school principals, as expected and perceived by themselves as well as by teachers, whose perceptions and behaviors can have an impact on the implementation of local ICT school policies.

End Notes

[1] Due to "mediamorphosis" (Fidler 1997), consisting in the current process of technological convergence that has been blurring the boundaries among different types of media over the last years, in this paper the term "ICT" refers to both "old" media, such as radio and television, as well as "new" media, such as desktop and laptop computer, mobile phone (with or without Internet access) etc.

[2] In this paper, ICT integration into teaching refers to both teaching through the media and teaching about the media.

[3] The research, which is the first and only one ever conducted among the schools of Palermo so far, was carried out by the Department of Social Sciences, University of Palermo (now joined the Department of Politics, Law and Society), under the direction of Prof. Gianna Cappello. The research was financially supported by the Regional Schools Office of Sicily.

References

Akbaba-Altun, Sadegul. 2004. "Information Technology Classrooms and Elementary School Principals' Roles: Turkish Experience." *Education and Information Technologies* 9(3): 255–270.

Albirini, Abdulkafi. 2006. "Teachers' Attitudes Toward Information and Communication Technologies: the Case of Syrian EFL Teachers." *Computers & Education* 47(4): 373–398.

Anderson, Ronald E., and Sara Dexter. 2005. "School Technology Leadership: An Empirical Investigation of Prevalence and Effect." *Educational Administration Quarterly Journal* 40(1): 49–82.

Baylor, Amy L., and Donn Ritchie. 2002. "What Factors Facilitate Teacher Skill, Teacher Morale, and Perceived Student Learning in Technology Using Classrooms." *Computers & Education* 39(4): 395–414.

Buckingham, David. 2001. "Media Education. A Global Strategy for Development. A Policy Paper prepared for UNESCO Sector of Communication and Information". http://portal.unesco.org/ci/en/files/5681/10346129690Policy_paper_by_Pr_David_Buckingham.rtf/Policy%2Bpaper%2Bby%2BPr%2BDavid%2BBuckingham.rtf.

———. 2003. *Media Education: Literacy, Learning and Contemporary Culture*. Cambridge: Polity Press in association with Blackwell Pub.

Cappello, Gianna. 2009. *Nascosti nella luce. Media, minori e media education*, Milan: FrancoAngeli.

Cheung, Chi-Kim. 2009. "Media Education Across Four Asian Societies: Issues and Themes." *International Review of Education* 55 (1): 39–58.

Creighton, Theodore B. 2003. *The Principal as Technology Leader*. Thousand Oaks: Corwin Press Inc.

Cuban, Larry. 1986. *Teachers and Machines: The Classroom Use of Technology Since 1920*. New York: Teachers College Press.

Davis, Fred D. 1986. "A Technology Acceptance for Empirically Testing New End User Information Systems: Theory and Results." PhD diss, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA.

———. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology." *MIS Quarterly* 13(3): 318–339.

Davis, Fred D., Richard P. Bagozzi, and Paul R. Warshaw. 1989. "User Acceptance of Computer Technology: a Comparison of Two Theoretical Models." *Management Science* 35(8): 982–1003.

Dawson, Christella, and Glenda C. Rakes. 2003. "The Influence of Principals' Technology Training on the Integration of Technology into Schools." *Journal of Research on Technology in Education* 36(1): 29–49.

Fidler, Rogers. 1997. *Mediamorphosis. Understanding New Media*. Thousand Oaks, CA: Pine Forge Press.

Fishbein, Martin, and Icek Ajzen. 1975. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Flanagan, Linda, and Michele Jacobsen. 2003. "Technology Leadership for the Twenty-First Century Principal." *Educational Administration Journal* 41(2): 124–142.

Fullan, Michael G., Matthew Miles, and Stephen E. Anderson. 1988. *Strategies for Implementing Microcomputers in Schools: The Ontario Case*. Toronto, Ontario: Ministry of Education. Ontario Ministry of Education.

Fullan, Michael G. 2002. "The Change Leader." *Educational Leadership* 59(8): 16–21.

Hamzah, Mohd Izham Mohd, Norazah Nordin, Kamaruzaman Jusoff, Rusnah Abd Karim, and Yusma Yusof. 2010. "A Quantitative Analysis of Malaysian Secondary School Technology Leadership." *Management Science and Engineering* 4(2): 124–130.

Hobbs, Renee. 1998. "The Seven Great Debates in the Media Literacy Movement." *Journal of Communication* 48(1): 16–32.

Likert, Rencis. 1932. "A Technique for the Measurement of Attitudes." *Archives of Psychology*, Vol. 140.

Merkley, Donna J., Mary Bozik, and Kathy Oakland. 1997. "Investigating Support for Teachers Using Distance Learning in Education: a Case Study." Deonews 7(11). http://www.ed.psu.edu/acsde/deos/deosnews/deosnews7_11.asp.

Mokhtar, Intan Azura. 2005. "Education in the Information Age – A Preliminary Study of the Changing Roles of School Teachers in Singapore." *Educational Research for Policy and Practice* 4(1): 27–45.

Mulkeen, Aidan. 2003. "What Can Policy Makers Do to Encourage Integration of Information and Communications Technology? Evidence from the Irish School System." *Technology, Pedagogy and Education* 12(2): 277–293.

Park, Han Woo, and J. Patrick Biddix. 2008. "Digital Media Education for Korean Youth." *The International Information & Library Review* 40(2): 104–111.

Pelgrum, Willem J. 1993. "Attitudes of School Principals and Teachers Towards Computers: Does it Matter What They Think?" *Studies in Educational Evaluation* 19(2): 199–212.

Pelgrum, Willem J. 2001. "Obstacles to the Integration of ICT in Education: Results from a Worldwide Educational Assessment." *Computers & Education* 37(2): 163–178.

Polizzi, Gabriella. 2009a. "La Media Education nelle scuole palermitane: pratiche d'uso dei media e percezioni diffuse tra gli insegnanti." In *Nascosti nella luce. Media, minori e Media education*, by G. Cappello, 184–227. Milan: FrancoAngeli.

———. 2009b. "Introducing Media Education into School Teaching. An Empirical Research Among Public School Teachers in Palermo, Italy." In *Social Dimension of Innovation*, edited by Karel Müller, Steffen Roth, and Milan Žák, 158–174. Prague: Centre for Economic Studies.

Rogers, Everett M. 1995. *Diffusion of Innovations*. 4th ed. New York: The Free Press.

Serhan, Derar. 2007. "School Principals' Attitudes Towards the Use of Technology: United Arab Emirates Technology Workshop." *The Turkish Online Journal of Educational Technology* 6(2): 42–46.

Sheingold, Karen. 1991. "Restructuring for Learning with Technology: The Potential for Synergy." *Phi Delta Kappan* 73(1): 17–27.

Siino, Antonino. 2009a. "La Media Education nelle scuole palermitane. Percezioni e pratiche tra i dirigenti". In *Nascosti nella luce. Media, minori e Media education*, by G. Cappello, 228–240. Milan: FrancoAngeli.

Siino, Marianna. 2009b. "La scuola palermitana: un percorso di ricerca tra tendenze e prospettive". In *Nascosti nella luce. Media, minori e Media education*, by G. Cappello, 167–183. Milan: FrancoAngeli.

Tyack, David B., and Larry Cuban. 1995. *Tinkering Toward Utopia, A Century Of Public School Reform*. Cambridge, MA: Harvard University Press.

Tondeur, Jo, Hilde van Keer, Joan van Braak, and Martin Valcke. 2008. "ICT Integration in the Classroom: Challenging the Potential of a School Policy." *Computers & Education* 51(1): 212–223.

Venkatesh, Viswanath, Michael G. Morris, Gordon B. Davis, and Fred. D. Davis. 2003. "User Acceptance of Information Technology. Toward a Unified View." *MIS Quarterly* 27(3): 425–478.