



# School Principals' Attitudes Towards Computers and Computer Use and Level of computer Integration in Moroccan Public Schools

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**Abstract:** This study investigated the relationship between school principals' attitudes and the impact this has on level of computer integration and use in Moroccan public schools. Data were collected by surveying 167 school principals via two different instruments, namely the Computer Attitude Scale (CAS) of Gressard and Loyd (1986) to measure school principals' attitudes towards computers and computer use and level of technology integration (LoTi) of Moersch (1999) to measure the various levels of technology integration, especially a computer. The obtained results suggested that there is a negative correlation between school principals' attitudes towards computer use and the level of technology integration at the level of (CAS) with ( $r = -.32$ ,  $n = 167$ ,  $p < .0005$ ) and at the four (CAS) sub-scales as well. The results obtained at this level accentuate another negative correlation existing between computer confidence ( $r = -.23$ ,  $n = 167$ ,  $p < .0005$ ), computer liking ( $r = -.40$ ,  $n = 166$ ,  $p < .0005$ ), computer usefulness ( $r = -.25$ ,  $n = 167$ ,  $p < .0005$ ) and computer anxiety ( $r = -.08$ ,  $n = 167$ ,  $p < .0005$ ) and level of computer integration. Recommendations for research and practice are provided in light of the reviewed literature and the obtained results.

**Keywords:** Technology Integration; Computer and computer use; School principals; Attitudes; Computer anxiety

## 1. Introduction

Information and communication technology (ICT), hereafter only technology, refers to various communication technologies such as mobile applications, computers, software and other media applications that provides information to users in a digital form (Koh et al., 2022; Sargent & Casey, 2020). It has grown increasingly universal, powerful, and adaptable and its advances have transformed radically the world we live in (Casey et al., 2017; Koh et al., 2021; Selwyn & Stirling, 2016) and affected the way we think, work, live and communicate (Grabe, 2007). Because it is occurring at a very dizzying speed, technology forced schools to survive unprecedented social, cultural, and pedagogical challenges and changes (Meesad & Sodsee, 2020). To begin with, technology has influenced and enhanced the quality and quantity of teaching and learning due to its capability in providing a dynamic, interactive, engaging content and proactive teaching-learning environment (Arnseth & Hatlevik, 2012; Falloon, 2020; Joo & Choi, 2021; Roure et al., 2019). In addition, it has provided real opportunities for individualized instruction and the exploratory nature of learning and offered the potential to accelerate, enrich, and deepen a wide range of skills to function well in a 21st century society and workforce (Chow et al., 2011; Schiller & Tillett, 2004). Moreover, technology has

helped in the motivation and engagement of students in learning (Bodsworth & Goodyear, 2017; Casey & Jones, 2011; Goodyear, Casey, & Kirk, 2014; Pyle & Esslinger, 2014) and helped in relating school experiences to job market and work practices and to meet the ever-changing situational demands (Chow et al., 2013; Rudd et al., 2021). Finally, technology has contributed to radical changes into schools through the provision of opportunities for connection between these schools and the rest of world through e-mails, mailing lists, chat rooms, and learning management systems (LMSs) (Davis & Tearle, 1999; Lemke & Coughlin, 1998).

According to a review of 28 major reports on technology integration in American schools, Honey and Mandinach (2005) identified three major reasons for technology integration in education. They claimed that it is generally used as a tool to address challenges in teaching and learning first, a change agent second, and a central force in economic competitiveness finally. As a tool for addressing challenges in teaching and learning, technology has helped in delivering, managing, and supporting effective teaching and learning by providing a wide range of tools that can be used in classrooms to improve the quality of teaching and learning (Bruniges, 2007; Lefebvre et al., 2006; Bingimlas, 2009; Hamidi et al., 2011). It also supports diverse and process-oriented forms of writing and communication and broadened the scope and timeliness of information resources available in the classroom. That is said, individuals are given the freedom to interact with the learning environment to formulate their own functional movement solutions that best match their unique individual characteristics and action capabilities to meet task demands (Hussain et al., 2011; Rudd et al., 2020). It has connected geographically dispersed audiences and brought them together through the use of different tools and online spaces (Chen and Zhang, 2010). It has, finally, helped students learn even in time of crisis anywhere, anytime in any rhythm and with any means, develop their skills, push onward their motivation and enlarge their knowledge and imagination by learning in different modes with combinations of text material, television broadcasts and online interactions (Bokayev et al., 2021). Overall, technology has all the potential to empower school principals, teachers and learners, promote change in schools and foster the development of skills needed to face the challenges confronting the 21st century schools (Ghamrawi, 2010).

As a change agent, technology has catalyzed various other changes in the content, methods, methodology and overall quality of teaching and learning, thereby ensuring constructivist and communicative inquiry-oriented classrooms where students have the opportunity to develop new competencies needed for the current globalized world (Brown & Cocking, 2000). Following this perspective, Reeves (1998) made a clear distinction between “learning from” and “learning with” technology. Learning from technology implies using the computer as the real instructor who is delivering instructions on basic skills. However, learning with technology implies that the computer is just a tool like any other tools that facilitate the process of learning, enhance the learning environment and helps students gather, organize and analyze problems, but they do not directly teach. This view supports constructivist teachings and endorse the idea that technology is a cognitive tool that can be used to expand on student learning.

According to McLeod, Richardson, and Bathon (2011), technology in education has caused disruptive and continuous changes that necessitate new ways and forms of thinking and reconsidering nearly all elements of the education system. To begin with, technology has changed the concept of teacher centered learning to student centered learning. With this shift in focus, teachers nowadays assume new roles and act as coaches, mentors and knowledge facilitators who present students with challenging real-life problems and the technology tools to solve them (Means & Olson, 1994). They are no longer the center of attention as the only dispenser of information. They become strong managers

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of a learning environment that focuses more than ever before on a real time problem -solving methods (Duffy & Cunningham, 1996).

Similarly, and with the uptaking of these new roles by teachers as coaches, facilitators, mentors, students also take on a new role. When they use technology as a tool or a support for communicating with others, they are in an active role and position and act as active participants rather than passive recipient of information. They actively make choices about how to generate, obtain, manipulate, display and/or make use of information. Technology use, in this respect, allows many more students to actively think about information, making choice and voice, and executing skills than is typical in teacher-led lessons. Additionally, when technology is used as a tool to support students in performing authentic or real-life tasks, the students are in a better position to define their goals, make appropriate decisions, and judge themselves their progress. Moreover, with the spread and availability of applications (free and/or paid), many options and choices are offered to individual learners and institutions to create competitive edges and choose when, where and even how to learn (Oliver, 2002).

As a central force in economic competitiveness, technology has proved to be a strong force in the growth and development of societies, especially now that international competitiveness is heralded worldwide as the ultimate economic objective of a government (Porter, 1990). Similarly, the role of technology in competitiveness has been widely acknowledged as one of the main drivers of economic growth (Cameron, 1996; Freeman, 2002; Gibson & Naquin, 2011; Hall & Jones, 1999; Rosenberg, 2004; Wang et al., 2007). This relationship between technology development or innovation, competitiveness and economic growth has become a jointly concerted effort of policy and decision-makers worldwide according to Filippetti and Archibugi (2011), which results in more and more countries now strive to secure sustainable sources of economic growth, especially in the wake of the recent economic crisis (Aghion et al., 2010). Researchers such as Schumpeter (2002), observed that innovation or technological advance is the only determinant of economic progress nowadays. According to the same researcher, if the level of technology becomes constant the process of growth stops and becomes stagnant as well. Thus, it is the technological progress which keeps the wheel of the economy moving. In line with globalization and economic competitiveness and the rapid changes in societies because of the pandemic (Covid 19) and wars in many parts of the world (Russia and Ukraine), education systems worldwide have shifted their focus to an education that prepares students as the future workforce and leaders who are innovative, creative and technology savvy (Ghavifekr & Sufean, 2011).

However, the promotion of technology in general and computer use in schools requires strong political will, strategic planning and long- term vision by education policy and decision makers. It also entails technology leaders who can act as strong advocates to take on the mantle of digital literacy in schools and help teachers and learners use technology. According to a substantial body of the existing international literature on technology integration, school principals' technology leadership is the most critical element in setting up technology as part and parcel of school culture (Anderson & Dexter 2000; British Educational Communications and Technology Agency (BECTA), 2003; Flanagan & Jacobsen, 2003; Ghamrawi, 2010; Haynes, 2007; Kearney & McGarr, 2009; Kirkland & Sutch, 2009). McKenzie (2002) maintained in this regard that "Smart uses of new technologies are more likely to thrive in schools whose principals play a central, encouraging role. When principals act as instructional leaders, and they model discerning as they lead staff through wise choices to sound daily practice, the program is much more likely to thrive" (p. 1). Leadership, then, is necessary to the success of all school operations including plans, visions, strategies and initiatives to integrate technology into schools.

According to Anderson and Dexter (2005), technology leadership refers to a school's more effective use of information technology in decision-making, policy-making, and actions. Accordingly, principals are expected to master the necessary competencies in digital literacy to promote focused leadership for students and teachers (Christopoulous et al., 2021). They have a duty and responsibility to ensure that teachers have the resources needed to deliver high levels of knowledge for the optimum academic performance of learners. They also have an obligation to motivate themselves to be visionary leaders in a dynamic and digitally changing era, as they stand to empower the key stakeholders in the learning sector for current and future learning (Afshari et al., 2008).

Along this same vein, many, researchers such as Akbaba-Altun (2006), Brockmeier (2002), Golden (2004), Knezek and Christensen (2002), and Laouni (2020, 2022) have taken an effort to analyze the factors that affect school principals' use and integration of technology in school. Some have focused on infrastructure like Akbaba-Altun (2006), Light and Rockman (2008), Kraemer et al. (2009), Vyasulu Reddi and Sinha (2003), Winthrop and Smith, (2012), but this has proved insufficient to guarantee successful use and integration of technology into education. Others such as Golden (2004) and Riedl et al. (1998) have zoomed in leadership as a determinant factor that impact the use of technology in the educational system; while others like Bozeman and Spuck (1991), Hope and Brockmeier (2002) have concentrated on the importance of technology training for school principals as sine qua none for technology integration. Some others such as Knezek and Christensen (2002), Sujo-Montes and Gallagher (2010), Technology Standards for School Administrators (TSSA) (2009) have stressed the skills and competencies needed by school principals to become and act as digital or technology leaders. Similarly, some others like Afshari et al. (2009), Chandan (1987), Grossman and Ross (1991), Ghamrawi (2013) and Laouni (2020) have discussed Leadership styles and their role in technology integration. Others, such as Kent and Giles (2016) and Laouni (2022), finally, have explored the issue of self-efficacy and the extent to which it affects school principals' technology integration into school. However, and despite these attempts to define the role these factors may have on technology integration and computer use at schools, the role of principals' attitudes toward computer and computer use and technology integration in general have not been widely researched or explored in a number of countries (Akababa-Altun, 2001; Kozloski, 2006) and still can't find their way in Morocco and many other Arab and African countries.

In the Arab world, and in spite of the amount of money, time and energy invested to incorporate technology into education, several countries still lag behind, according to a report from UNESCO that was initiated in 2013 on how technology is being used in education across five countries in the Middle East (Egypt, Jordan, Oman, the Occupied Palestinian Territories and Qatar. The report identified four main indicators of how technology use rates in education: infrastructure, gender, teacher preparedness and policy. According to the report, all five countries have not reached their potentials in technology use in schools, they have not succeeded in the permeation of ICT curricula across all grades of primary and secondary education as well; though they have formally developed policies to integrate ICT in education by establishing "regulatory institutions to ensure that ICT-assisted educational reform takes place.

In Morocco and although the situation of technology integration and use in schools is still unsatisfying, this later has always been among the first countries in the African continent with regards to the deployment of technology. It is also considered as the first African nation in the use of technology in a wide range of sectors of the society according to the international Union of Telecommunications (IUT) . Similarly, Morocco was one of the first countries in the Middle East and North Africa region to set up genuine telecommunications policies that included upgrading and expanding the telecommunications infrastructure as well as popularizing the use of technology in a number of active

sectors of the society such as education, as a prerequisite to leapfrog toward higher levels of economic and social prosperity (InfoDev, 2011). Following this reasoning, and as early as 1999, a national strategy was developed to lay out and depict the country's ICT vision (the five-year visioning document or plan) (1999-2003), which later became the foundation for subsequent plans or strategies such as E-Morocco (2005-2010) that was updated in 2010 to become Digital Morocco (2013)- (Maroc- Numeric 2013) strategy.

In parallel lines with Morocco's ICT vision and strategies to integrate technology, many reforms have been initiated to revamp and develop the education and training system by using technology at schools. Lever 10, articles (119, 120 and 121) in The National Education and Training Charter (CNEF) (2000-2009) encourages the integration of technology in education and promotes the establishment of computer facilities in schools with a view of paving the way for distance education and learning. In addition, and by considering the prominent role of technology in education, the National Charter established consistency between learning and the socio-economic environment or job market to generate flexible and trainable workers who have problem-solving abilities and higher cognitive and labor skill compatible with the requirements for productivity in the 21st century.

Similarly, Project (E1.P10) in The National Education Emergency Program (2009-2012) focuses on the integration of technology in education, support the acquisition of computing facilities at schools and promote distance education and learning as well. The main objectives of this project are to equip schools with technology so as administrators, teachers and students can use it, train the entire teaching and administrative staff on technology use, develop a digital content that conforms with national curricula through a policy of support and promotion of good practice and finally, implement and activate the piloting phase of GENIE program (Generalization of Information Technologies and Communication in Education in Morocco); which was launched in March 2005 as a strategic priority to boost and transform education in the country through the concentration on three complementary axes: Infrastructure, training, and the development of pedagogical content (GENIE, 2005). However, and although these reforms witnessed some successes in technology integration in education, they have not fully delivered on their promises. Morocco ranked 119th out of 137 countries for quality of education system. The ranking got worse the following year, dropping to 120 according to the World Economic Forum's annual report for 2016/2017. In addition, the relationship between education and economic growth has remained weak, the gap and/or discordance between education and employment has not been fully bridged, and the quality of education continues to be disappointing even though schools, teachers and students use technology.

In light of evidence mentioned from previous research and given the importance of school principals' role in incorporating computers into schools, investigating the relationship between school principals' attitudes toward computer and computer use and level of computer integration in Moroccan public schools seems logical. The objective of the study, therefore, is to expose the prima facie conditions for a better understanding of the relationship between school principals' attitudes toward computer and computer use and level of computer integration in Moroccan public schools. To attain this objective, the following research questions were investigated:

1. What are school principals' attitudes towards computers and computer use in Moroccan public schools?
2. Is there a significant correlation between school principals' attitudes toward computer and computer use and level of computer integration in Moroccan public schools?
3. To what extent do school principals' age and administrative experience influence their attitudes toward computer and computer use in Moroccan public schools?

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## 2. Literature Review

The era of 21st century is most often described as the era of technology per se. Today technology can be a powerful tool for transforming teaching and learning. It can also help in a number of ways to develop and advance relationships between teachers and students, reinvent the existing methods and approaches to teaching, learning and collaboration, shrink long-standing equity and accessibility gaps, and adapt learning experiences to meet the needs of all types and styles of learners. Overall, the expansion of computer technology and the Internet has brought tremendous change into schools in general and to instructional practice in particular (Hastings & Tracey, 2005).

When technology is used appropriately or directly applied into schools and universities, both the students and teachers can benefit from the wide range of advantages and opportunities it provides. To begin with, technology can serve to increase student achievement in schools in two different but interrelated ways. First, the removal of physical barriers to learning and second, the shift of focus from the retention of knowledge to its utilization. The removal of physical barriers, to begin with, has allowed learners to tap resources and expertise anywhere in the world. For example, with the spread of mobile data collection tools and online collaboration platforms, students in remote geographic areas studying different school subjects and local phenomena can collaborate with peers doing similar work within their communities or other communities anywhere in the world. Similarly, a school with connectivity but without robust science facilities can offer its students virtual simulations and demonstration activities in chemistry, biology, anatomy, and physics, offering students, thus, a learning experiences that approach those of peers with better resources and tools. This encourages and support students' active exploration of phenomena and allowing them to enrich their scientific concepts and become familiar with the application of science during their participation in activities. According to (Krajcik & Czerniak, 2007; Linn, 2003), learning environments built by technology foster students' scientific concepts, and help them develop their ability and capacity to investigate practical matters and explore the nature of science. Finally, technology-enabled learning environments permit less experienced learners to access and participate actively in specialized learning communities of practice and gain knowledge and experience needed to become expert members of the community. These opportunities offered by technology help in increasing possibilities for all students to learn equally or rather affording all students, including disadvantaged students, greater equity of access to high-quality learning materials, expertise, personalized learning, and tools for better learning.

Similarly, technology can offer teachers the opportunity to connect to people everywhere in the world, have access to data, content, resources, expertise, and learning experiences that can empower and inspire them to provide more effective and updated teaching for all learners. Through technology, educators can connect with other educators and experts across their communities or around the world to broaden their perspectives and create opportunities for students to learn in an appropriate, relevant and authentic manner. By using online learning environments such as Learning Management systems (LMS) and tools such as videoconferencing, online chats, and social media sites for example, educators everywhere in the world can connect and collaborate with experts and peers from around the world to form online professional learning communities (P.L.C). Moreover, technology has provided educators with unprecedented opportunities to lean from professionals in the field through ongoing professional learning. That said, professional learning and development programs should support and focus on the development of educators' identities as fluent users of technology and experts throughout their careers in order to become technology leaders who are seeking new knowledge and constantly acquiring new skills alongside their students.

However, to reap the benefits of technology into schools and realize educational transformation, a number of prerequisites should be present. To begin with, a robust and flexible learning infrastructure capable of supporting new types of engagement and providing ubiquitous access to the technology tools that allow learners to create, design, and explore should be established in the first place. According to Pelgrum (2001), ICT infrastructure refers to the availability of equipment, software, Internet access and other similar resources in the school. These resources and facilities if they exist in schools, they can support continuous transformation and development of various learning approaches (Anderson, van Weert & Duchâteau, 2002). According to Vanderlinde and van Braak (2010), technology infrastructure measures the perceived availability and suitability of the ICT tools such as hardware, software and peripheral equipment provided in the school. This includes, but not limited to persistent access to high-speed internet in and out of school, powerful learning devices, access to mobile devices that connect learners and educators to the vast resources of the internet and facilitate communication and collaboration, and access to high-quality digital learning content and tools that can be used to design and deliver engaging and relevant learning experiences.

Technology infrastructure is just one element of educational transformation. Equally important is the focus on and investment in high-quality professional learning and newest instructional methodologies that support blended and personalized learning for all students. Education decision makers, researchers and educationists, should come together in the interest of designing pre- and in-service professional learning programs and opportunities that are aligned specifically with the demands and challenges of today's VUCA (Volatile, Uncertain, complex, Ambiguous) world, and design professional learning experiences or opportunities that are based on and powered by technology to increase teachers' digital literacy and enable them to create compelling learning activities that improve learning and teaching, assessment, and instructional practices. Similarly, and because of the challenges to shift education from face to face to online environments during the Covid 19, there should necessarily be a shift of focus as well in developing a teaching force skilled in online and blended instruction and proficient in globally relevant competencies.

In parallel lines and order to integrate technology appropriately into schools and take full advantage of its potentials to transform learning, a strong leadership is needed inside schools. School leaders need to be capable of creating a shared vision of which all members of the community feel a part. They should also delegate the articulation of that vision for how technology can support change and instore innovation inside school. According to Dexter, Anderson, and Becker (1999), technology is most likely to promote learning where school culture provides support for changes and innovation. This means that the school principal must understand first how the culture within the school will accept the change and adopt it and where the culture may need to be modified in order to ensure acceptance, adoption, implementation, confirmation and then use by the school community (Rodgers, 2003).

All things considered, technology alone, the development of teachers and school principals' technology-based competencies, skills and knowledge and the provision of a solid infrastructure are not sufficient and can't help in an efficient technology integration into schools. These factors should necessarily be coupled with strong leadership, motivation, and positive attitudes. Accordingly, stakeholders in the system should act together and plan beyond technology alone.

Attitudes are defined as the feelings that an individual has about people, groups and other types of objects in our social world. It is the overall understanding and beliefs we have vis-à-vis someone or something (Kind et al., 2007). It is also the behavioral disposition (Campbell, 1963), degree of positive evaluation or mental readiness to exert a dynamic influence upon a behavior (Allport, 1935). According to Eagly and Chaiken (1993), attitude is "a psychological tendency that is expressed by evaluating a

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particular entity with some degree of favor or disfavor” (p. 1). Inherent in this definition is the idea that an attitude necessarily involves forming and reporting an evaluative judgement or a response about a stimulus entity. Put differently, reporting an attitude is conditioned by making a decision concerning a particular issue, object or person by liking or disliking it and accepting or refuting it. Seen from this prism, the term attitude is often used as an umbrella expression that covers other concepts like preferences, feelings, emotions, beliefs, judgments, appraisals, values, principles, opinions, and intentions (Bagozzi, 1994a, 1994b).

Being an evaluative judgement, an attitude can be positive or negative or even neutral. It can have degree as well. Some may feel very strongly or passionate about something or someone, while others might feel much less strongly about the same thing or person. In general, an attitude can be thought of as an overall evaluation (e.g., like–dislike) of an attitude object that is considered as the stimulus that triggers judgements along the dimensions of acceptability and favorability (Eagly & Chaiken, 1993). Within this scope, Fishbein and Ajzen (1975) described attitude as “learned pre-disposition to respond in a consistently favorable and unfavorable manner with respect to a given object” (p. 6).

Many models of attitudes have been proposed by different scholars to explain the constituents and nature of an attitude. Among the early models that have affected social psychology in general and research on attitudes in particular is the Expectancy-Value models. One of the major proponents of these models is Rosenberg (1956), who hypothesized that a person's attitude toward a given object would be "accompanied by a cognitive structure made up of beliefs about the potentialities of that object for attaining or blocking the realization of valued states” (p 367–372). According to Fishbein and Ajzen (1975), the Expectancy-Value Model of attitudes suggests that an object can have a number of attributes whereby a person can hold many beliefs about an attitude object.

Another model that underscores the centrality of attitudes in a person's decisions and choices is the Multiattribute Measurement model that was proposed by Fishbein (1963). This model is based on the theory of the creation and change of the attitude and is classified as one of the compensatory models which suggests that individuals generally choose the best alternative that gets the highest appraisal for the properties, they are most concerned about and not the characteristics of the attitude object alone (AlSamyda & Rudaina 2005). Attitudes, accordingly, play a pivotal role in the acceptance of an object (product, service, person, idea ... etc.) or the refusal of it. Put differently, subject properties or subject attitude and the properties they have, are considered as the basis in measuring attitudes because they play critical roles in the acceptance or rejection of the subject attitude (AlSamyda & Rudaina, 2013).

One of the most influential models that attempted to scrutinize the components of attitudes is the multicomponent model, referred to as the Tripartite Model (Eagly & Chaiken, 1993; Zanna & Rempel, 1988). This later conceptualizes attitudes as a summary evaluation that has affective, cognitive and behavioral components (Bagozzi & Burnkrant 1979; McGuire, 1968; Rajecki, 1990). The first component is the affective component of attitudes, which refers to feelings or emotions regarding an attitude object. This component claims that attitudes are formed on the basis of affective responses that precede conscious thought. They impact attitudes in a number of ways due to affective reactions or feelings that are aroused in the individual after exposure to the attitude object or stimuli. (Krosnick, Betz, Jussim & Lynn, 1992; Kunst-Wilson & Zajonc, 1980; Murphy & Zajonc, 1993; Zajonc, 1968). The second component is the cognitive component of attitudes which deals with thoughts and beliefs individuals associate with a particular object to form an attitude. Attitudes, accordingly, are derived from more elementary cognitions about the attitude object. A cognitive component, therefore, exists when individuals process information about the attitude object, which then forms beliefs (Eagly & Chaiken 1993). Finally, the third component refers to past behaviors or experiences with respect to an

attitude object. It is based on the overt actions that people exhibit or show in relation to the attitude object or against environment stimuli in general (Eagly & Chaiken 1993; MacKenzie & Lutz 1989). Attitudes, in this regard, are derived from past behaviors formed by direct or indirect experiences (Eagly & Chaiken, 1993). In line with this third component, computer experience or lack thereof plays a potent role in decisions vis- a- vis computer use in schools.

One of the potential barriers to successful technology integration in general and computer use education in particular is computer anxiety. Being associated with feelings of uneasiness, frustration, self-doubt and apprehension, computer anxiety can be looked at as a fear of computers when using one, or fearing the possibility of using a computer (Chua, Chen, & Wong, 1999). In this sense, it is different from negative attitudes toward computers that entail beliefs and feelings about computers rather than one's emotional reaction towards using computers (Heinssen, Glass, & Knight, 1987). Following this line of reasoning, computer anxiety detracts users of computers from task performance and makes participants while using a computer ill at ease and behave with emotional fear of potential negative outcomes such as damaging the equipment or looking foolish while using a computer in front of other. Overall, many researchers consider that the reluctance of principals and teachers to adopt and use technology goes back to their computer experience, anxiety, lack of perceived usefulness of technology in education, and lack of perceived ease of use of technological devices (Kanfer & Heggstad, 1999; Totolo, 2011). Conversely, computer experience may lead to positive attitudes toward computer and computer use and as a such can decrease the level of computer anxiety (Matthews & Shrum, 2003).

The relationship between attitudes and technology integration has been highlighted in a plethora of research and related theories or technology integration models since the early 80s. In addition, the quality and availability of educational technology in schools, along with the technological literacy of school principals, teachers and students, have increased significantly in the past decade (Gray, Thomas, & Lewis, 2010; Jimoyiannis & Komis, 2007; McMillan-Culp, Honey, & Mandinach, 2005; Nagel, 2010; Russell, Bebell, O'Dwyer, & O'Connor, 2003; Wen & Shih, 2008). Many attitude surveys have shown that any successful change in educational practice requires the development of positive user attitudes toward new technology (Woodrow, 1992). Fullan (1988) suggested that the attitudes of participants who are involved in an educational innovation play a key role in determining to what degree and with what speed change will happen in an organization. Following this same line of thought, Serhan, (2007) argues that positive attitudes of a school principal can help in expending motivation and interest to the teaching faculty in the school and hence to the classroom and the students. When school principals feel comfortable using the technology and realize its possible applications and integration in education, then they can help facilitate its incorporation into instruction or the curriculum as well as the management of school. According to Pelgrum (1993), "schools, whose principals have positive expectations regarding the educational impact of computers, tend to emphasize computer integrated learning more than schools with principals who are less positive" (p. 209). Similarly, Walsh (2002) highlights that technology integration could happen in schools only if school leaders have positive attitudes and are totally committed to set up technology and make it part of the school culture. Following this line of thought, a case study by Han (2002) found that principals who had positive attitudes towards technology were very successful in introducing these new technologies into their schools without any complications. As school leaders, they set directions and high expectations, model the behaviors desired in a school, equip schools with sufficient computers and ensure that staffs have access to relevant technology.

In consonance with a number of technology adoption models, technology adoption and integration is not related to the aspects of technology alone, but has evolved as a much more complex process

involving dimensions of user attitudes as an essential factor to reject, accept, and use an innovation (Venkatesh et al.2012). As reported by Rogers' (1995), Diffusion of Innovation Theory (DOI), for an innovation to be accepted, it should pass through a long process namely individuals' knowledge about the innovation and their attitudes toward it, which are based or derived mainly from the perceptions previously formed by users. Similarly, Theory of Reasoned Action (TRA) of Fishbein and Ajzen (1975) purports that the most immediate determinant of behavior is behavioral intention, and the direct determinants of people's behavioral intentions are their attitudes towards performing the behavior and the subjective norm associated with the behavior (Ajzen& Fishbein, 1980; Fishbein & Middlestadt, 1989; Montaro & Kasprzyk, 2008). According to TRA, a behavior can largely be predicted by the individual's attitudes towards performing the behavior in question through the intervening effect of behavioral intentions. That is, behavioral intentions of a person depend largely on his attitudes and subjective norms. Individuals with positive subjective norms toward a volitional behavior are more likely to have positive attitudes toward performing the behavior, while those with negative subjective norms are likely to have negative attitudes toward the behavior.

Equally important, another theory that was developed from TRA to explain attitudes or how human actions are guided to form an attitude and engage in a behavior is the Theory of Planned Behavior (TPB) (Ajzen, 1991). This theory posits that an individual behavior is driven by behavior intentions, where behavior intentions are a function of three determinants: an individual's attitude toward behavior, subjective norms, and Perceived Behavioral Control (PBC), which refers to "people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p 179).

Davis (1989)'s Technology Acceptance Model (TAM) posited that the behavior of an individual depends largely on his or her intentions, which derive from attitudes and subjective norms. He argues that in addition to attitudes to accept or refute an innovation, the intention to use any technology is influenced by two other relevant factors that are derived from Bandura's self-efficacy theory (1982). Perceived ease of use (EU), which refers to "the judgements of how well one can execute courses of actions required to deal with prospective situations" (Bandura, 1982, p.122) and perceived usefulness (U), which designates "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers & Shoemaker, 1971, p.15).

One more final model that tried to review and consolidate the constructs of earlier models of technology adoption, attitudes and acceptance is Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, 2003). This model, which aims to explain technology acceptance, is based on eight theories of technology acceptance: Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), the combination form of TAM and TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), Motivational Model (MM), and the Social Cognitive Theory (SCT). At the core of this model are behavioral intentions (The expectation and attitude of the user's intention to perform plans and decisions regarding the use of technology) (Venkatesh, 2003).

In addition to models of attitudes and technology adoption theories many studies have strikingly explored the attitudes of school principals toward technology integration. Akaba-Altun (2004) investigated the attitudes of 124 Turkish elementary school principals toward technology use, the results of which revealed that the majority of school principals had positive attitudes toward technology and as a consequence the level of computer use was high. In a similar study, Abdul Razzak (2015) explored school principals' attitudes toward technology in the country of Bahrain. The study revealed that because of the positive attitudes of school principals towards computers and computer use, many teachers developed, in their turn, positive attitudes and started using computers in a very noticeable

way in their classrooms. According to the same study, teachers developed positive attitudes towards computers and computer use because of school principals' support, encouragement and understanding. They provided training workshops for those who need it during the implementation process in their schools and recognized teachers' efforts and praised them in the school council's meetings. Consequently, these same teachers even suggested effective strategies to overcome the challenges facing technology integration in their schools, such as constructing a clear and unified school vision that would please, excite and motivate teachers and other school staff to use technology, which could come only if one has a positive attitude toward technology.

Another study by Derar (2007) revealed that school principals in UAE had positive attitudes toward the use of technology in teaching. They wanted to support the use of technology in their schools and to improve their knowledge and skills to facilitate the integration of technology into the local curriculum. Moreover, these same principals became more motivated and their attitudes toward technology increased in a noticeable way following a workshop that aimed at vulgarizing the use of technology among school principals. These findings indicate that when school principals do not appreciate technology, they are unlikely to encourage its use in their schools and/or adopt it themselves.

However, studies on school principals' attitudes and technology integration in Morocco are missing. No documented study had been carried out to address the principals' attitudes towards technology as a factor influencing the use of computers by school principals. This study did exactly that. The existing studies to date have focused on teachers and students' specifically as if technology integration is the business or concern of teachers and students only, while school principals have no say in what technology is and for what purposes it would serve in school, classroom and instruction. Previous local studies have focused on different forms and issues on leadership within the context of Moroccan schools (Amghar, 2017; Ezzaki, 2007; El Meski, 2013), but did not discuss the role of school principals as technology leader and the role they might play in technology integration within educational institutions if their attitudes are positive and vice versa.

For technology integration plans in schools to be successful, school principals should hold favorable attitudes toward that technology first. Through their attitudes, behaviors and perceptions, they can introduce innovations in school in an easy way to reach teachers, students and the rest of the administrative staff inside the school. Put differently, as school principals develop beliefs about their ability to use and work with technology, this will in turn affect the favorableness of their attitudes towards technology.

### **3. Methodology**

This paper investigates computer use in Moroccan public schools through the exploration of school principals' attitudes toward computer and computer use and level of computer integration in Moroccan public school. Basically, this study seeks to grips with how principals' attitudes towards computer and computer use influences the level or degree of computer integration and use in the institution they lead and manage employing a quantitative correlational design.

#### **3.1 Data collection techniques and participants' demographics**

To collect data, the present study employed non-random snowball, volunteering and networking techniques which are practically used when the population is large, geographically dispersed and hard to list or enumerate and reach. Snowball sampling, which is also referred to as chain-referral sampling, usually starts with a convenience sample of initial subjects that serve as "seeds" through which a subject recruits other subjects and other subjects recruit others in their turn and so on, like a snowball

growing in size as it rolls down a hill (Heckathorn, 2017). Put differently, all the techniques used in this study (snowball, volunteering and networking) are based mainly on cascading referrals in which everybody who was requested to help in distributing the questionnaire encouraged in turn others to volunteer and do likewise with the rest of his or her networks. A full detailed account on participants' demographic characteristics is given in Table 1.

Table 1. School Principals' Demographic Characteristics

Item	%
<b>Gender</b>	
Male (n=161)	96.4
Female (n=6)	3.6
<b>Age (Years)</b>	
- 118 over 50	70.65
- 36 (46-50)	21.55
- 09 (41-45)	05.4
- 04 (36-40)	02.4
<b>Administrative Experience</b>	
- 21 (1-5)	12.6
- 52 (6-10)	31.1
- 56 (11-15)	33.5
- 38 (16-20)	22.8
<b>Leadership position</b>	
11 participants ( more than 21 years)	6.6
<b>Degrees and Certificates</b>	
- 129 Baccalauriat	78
- 38 Undergraduate Degree	23
- 00 Master and Doctoral Degree	0
<b>Training in Technology Use</b>	
- 151 (Yes)	90.4
- 16 (No)	09.6
<b>Using Technology for more than 10 Years</b>	
128 (more than 10 Years)	76.6
19 (from 8 to 10 Years)	11.4
13 (from 6 to 8)	07.8
06 (from 4 to 6)	03.6
01 (less than 4)	06

The total number of school principals who participated in this study reached (n= 167) from all over Morocco. The largest part of participants in this study are males. There are 161 males (96.4%) and only 6 females (3.6%). The majority were drawing near the retirement age, which is in Morocco fixed at 63 years. 118 principals (70.7%) were over 50 (58/59 years old), 36 (21.6%) between 46 and 50, 9 (5.4%) between 41 and 45, and only 4 (2.4%) were between 36 and 40 years old. When it comes to administrative experience, 56 school principals (26.6%) had between 11 and 15 years of seniority as school principal, 38 (22.8%) had between 16 and 20 years, 21 (12.6%) had between 1 and 5 years and 11 (6.6%) principals had been occupying leadership positions for more than 21 years. The educational level and certification degree of participating principals revealed that (78%) were holders of only the Baccalaureate degree, (23%) were holders of university degrees (undergraduate studies) obtained in fundamental university subjects such as Arabic studies, History and Geography, Physics and others. The rest of the participants did not hold any other university qualifications or degrees, and none hold any master's or doctorate degrees. As far as training in technology use, only 16 principals (9.6%) did not have any previous training in technology use, while 151 principals (90.4%) had different types of trainings and can manage technology for instruction and management purposes. Similarly, 128 principals (76.6%) had been using technology for more than 10 years, 19 (11.4%) from 8 to 10 years,

13 (7.8%) from 6 to 8 years and only 6 principals (3.6%) had been using technology from 4 to 6 years, and only one school principal had been using technology for a period that is less than 4 years (between 2 and 3 years).

### 3.2 Research instruments

The research instruments used to yield quantitative statistical data for this research are the CAS of Gressard and Loyd (1986) to measure school principals' attitude toward computers and computer use and the LoTi of (Moersch, 1999) to assess the various levels of technology integration, especially computers, and measure school principals' level of computer use and integration in Moroccan public schools.

The CAS, to start with, is considered an appropriate metric for assessing attitudes toward computer and computer use and was utilized in this study to shine light on computer confidence, computer liking, perceived ease of use and usefulness, and finally computer anxiety. The original version of this first instrument was transformed and modified to fit the Moroccan context and serve to elicit information concerning the three research questions outlined that the study proposes to answer by stating level of agreement and/or disagreement on the items presented based on five-point Likert scales. The adapted version used in this study consists of 17 items instead of 40 in the original one.

Similarly, the LoTi questionnaire for building Administrators was adapted to measure Moroccan school principals' level of technology integration in general and computer use and integration in particular. This instrument was subject to important modifications by removing some items because they do not apply to and fit in the Moroccan context, and rewording others for more simplicity, clarity and practicality. In the LoTi framework, six discrete implementation levels are proposed, ranging from Nonuse (Level 0) to Refinement (Level 6). As a school principal progresses from one level to the next, a series of changes either in the context of the classroom and the instructional curriculum and/or the school at large are observed (Moersch, 2002). Before its implementation in the field, the internal consistency of the LoTi was calculated using Cronbach's Alpha reliability coefficient to know if the instrument still possesses sufficient consistency for research purposes. The Cronbach's Alpha reliability ranged from 0.72 to 0.88., proving thus, a strong reliability level to be used to collect data on school principals' level of technology integration.

### 3.3 Data analysis

The data collected was processed in SPSS (21.0). Descriptive statistics were utilized first to describe the properties of the population involved in the study and summarize the data by presenting Mean scores, standard deviations, and percentages. Correspondingly, various inferential statistical tests were used to draw conclusions based on exploration like regression analysis to identify which variables from CAS sub-scales have impact on level of technology integration in Moroccan public schools, correlation analysis to identify relationships between attitudes toward computer and computer use and level of technology integration, one way between groups analysis and two –way between groups analysis of variance to explore the link between different variables and gauge the differences between groups to look at individual and joint effect of two independent variables on one dependent variable such age and seniority in experience as school principal and the extent to which they affect attitudes and reciprocally affect computer use and technology integration in Moroccan public schools.

#### 4. Results and Discussion

The results obtained from the data collected and analyzed are given in the order of the corresponding research questions proposed to guide the present study.

##### **RQ 1: What are school principals' attitudes toward computers and computer use in Moroccan public schools?**

To react to this first research question, descriptive statistics were calculated first (means and standard deviations) to measure school principals' attitudes toward computers and computer use on a five points Likert – type scale where 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree, the results of which are presented in Table 2.

Table 2. Descriptive Statistics of School Principals' Attitudes toward Computer and Computer Use

	Mean	SD
Computer Confidence	<b>6.3832</b>	<b>1.93489</b>
Computer Liking	<b>9.8072</b>	<b>2.54871</b>
Computer Usefulness	<b>10.3832</b>	<b>3.40753</b>
Computer Anxiety	<b>4.0419</b>	<b>2.03391</b>

According to results shown in table 2 above, scores in attitudes toward computers and computer use ranged from a minimum score of 13 to a maximum score of 60 with a mean score of 30.58 and standard deviation of 31 in the overall attitudes scale. These results indicate clearly that school principals' attitudes towards computer and computer use are not completely negative. They are somehow positive, but not to the extent to make school principals use a computer without fear and hesitation. Similarly, table 2 also shows important results at the sub- scales level as well. For the computer confidence sub-scale, the mean score was 6.38 and a standard deviation of 1.93. The mean score for computer liking was 9.80 and a standard deviation of 2.54 and the mean score of computer usefulness was 10.38 and a standard deviation of 3.40. Nevertheless, the mean score of computer anxiety was 4.04 and a standard deviation of 2.03, which explains clearly that computer anxiety is a high determinant factor and one of the potential barriers that affect both attitudes toward computer and computer use and level of technology integration in Moroccan public schools.

It's none of a surprise then to say that when school principals suffer from computer anxiety, they have a strong fear about working with a computer or even thinking about using it in academic or professional works. They have a feeling of discomfort, apprehension and fear of coping with technology in all its forms and uses since negative dispositions toward computer are necessarily the outcomes of an individual's computer experience. Seen through this prism, attitudes are precursors of behaviors and behavioral intents. If the experience with computer is positive, it may lead to positive attitudes toward computer and can decrease the level of computer anxiety. Conversely, if that experience is negative, it will increase resistance toward computer use, inhibit and hinder all initiatives in using a computer in and outside school. In line with this fact, and in order to highlight the results obtained for research question 1, Kumar, Che Rose and D'Silva (2008) in a study of 318 Malaysian teachers' attitude towards computers and confidence in computer use discovered that there was a close relationship between attitudes towards computer and computer use and level of computer training, frequency of use and level of technology integration.

Using a regression analysis test to identify which variables have impact on level of technology integration, the negative beta value of computer anxiety indicates that there is a statistically significant negative correlation between computer anxiety and level of technology integration as Table 3 displays.

The regression model that is displayed in table 3 above shows that the negative beta value of computer

anxiety ( $\beta = -.047$ ) makes a statistically significant negative correlation with level of technology integration. This means that the more school principals have computer anxiety, the more they develop negative attitudes toward computer and computer use and the less their level of technology integration becomes. In other words, school principals' attitudes toward computer and computer use and level of technology integration become low when their computer anxiety is high.

Table 3. Standard Regression Coefficients of School Principals' Level of Technology Integration

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
-Computer Confidence	.017	.023	.055	.726	.469
-Computer Liking	.009	.017	.042	.563	.574
<b>-Computer Anxiety</b>	-.013	.017	<b>-.047</b>	-.797	<b>.427</b>
-Computer Usefulness	.006	.013	.035	.464	.643

### RQ 2: Is there a significant correlation between school principals' attitudes toward computer and computer use and level of computer integration in Moroccan public schools?

Following results of mean scores obtained in descriptive statistics related to research question 1, Pearson Product Moment correlations were also used to determine the relationships between school principals' attitudes toward computer and computer use as measured by CAS questionnaire and level of technology integration as measured by the LoTi instrument. The correlational results yield a weak negative correlation between attitudes toward computer and computer use and level of computer integration in Moroccan public schools ( $r = -.32$ ,  $n = 167$ ,  $p < .0005$ ) as it is displayed in Table 4 below.

Table 4. Correlation between the School Principals' Attitudes and the Integration of Computer at Schools

	<i>Principals' attitudes toward computer and computer use</i>		
	<i>Pearson r</i>	<i>Sig.</i>	<i>N</i>
<i>LoTi Scale</i>	<b>-.327**</b>	<b>.000</b>	167

\*\**. Correlation is significant at the 0.01 level (2-tailed)*

Seeking to know if there is a relationship between school principals' attitudes toward computer and computer use and level of computer integration, a more detailed analysis was conducted by using another *Pearson product moment correlation* test to explore the relationship between the four sub-scales (computer confidence, computer liking, computer usefulness and computer anxiety) and school principals' level of technology integration in Moroccan public schools. Results obtained revealed that there is a negative correlation as well between the four attitude sub-scales and school principals' level of computer integration. There is a weak negative correlation between the computer confidence sub-scale and school principals' level of computer integration ( $r = -.23$ ,  $n = 167$ ,  $p < .0005$ ). Similarly, there is a moderate negative correlation between the computer liking sub-scale and school principals' level of computer integration with ( $r = -.40$ ,  $n = 166$ ,  $p < .0005$ ). Moreover, there is a weak negative correlation between the computer usefulness sub-scale and school principals' level of computer integration with ( $r = -.25$ ,  $n = 167$ ,  $p < .0005$ ). Finally, a strong negative correlation exists between the computer anxiety sub-scale and school principals' level of computer integration with ( $r = -.08$ ,  $n = 167$ ,  $p < .0005$ ) as Table 5 shows.

The results of the data analysis related to (R.Q1) revealed that there was a weak negative correlation between school principals' attitudes toward computers and computer use and level of computer integration. The Pearson Product Moment correlations, which were used to determine the relationship between school principals' attitudes as measured by CAS, and level of computer integration as

measured by LoTi, revealed negative correlation as well between these two variables. This means that the more negative these attitudes are, the less school principals use and integrate computers in their schools. This finding is in stark contrast with the commonly held belief that having positive attitudes towards computer and computer use automatically leads to having a good level of computer integration. Many of the available data largely disputes this stereotype or the commonly held belief, and report on other factors that affect school principal' level of computer integration such as computer anxiety, computer self-efficacy, and comfort using computers (Nair, Lee, & Czaja, 2005; Czaja et al. 1993). According to Sang et al. (2009), the degree of self-efficacy and self-confidence of those who use computers more often increases with using computers and as a consequence, they experience less computer-related anxiety. The available data also indicates that attitudes toward computer and computer use and comfort using it are influenced by many other factors such as computer confidence, computer liking, computer usefulness and the degree of computer anxiety. The results obtained from descriptive analyses regarding these four sub-scales relating to the variable of attitudes towards computers and computer use explored in this research, revealed that Moroccan school principals had positive attitudes toward computers and computer use with a high degree of computer usefulness, computer liking and computer confidence, and with a low degree of computer anxiety. However, the results of the analyses obtained through the use of the Pearson Product Moment Correlation to explore the relationship between these four sub-scales revealed that there was a negative correlation between the four attitude sub-scales and school principals' level of computer integration. According to the results of the present research, there was a weak negative correlation regarding the computer confidence sub-scale, a moderate negative correlation in the computer liking and the computer usefulness, and finally a strong negative correlation concerning the computer anxiety sub-scale and school principals' level of computer integration in Moroccan public schools.

Table 5. Correlation Between CAS Sub-Scales and Loti

Computer Confidence	Pearson Correlation	<b>-.235**</b>			
	Sig. (2-tailed)	<b>.002</b>			
Computer Liking	Pearson Correlation	<b>-.403**</b>	.573**		
	Sig. (2-tailed)	<b>.000</b>	.000		
Computer Usefulness	Pearson Correlation	<b>-.257**</b>	.640**	.543**	
	Sig. (2-tailed)	<b>.001</b>	.000	.000	
Computer Anxiety	Pearson Correlation	<b>-.086</b>	.336**	.270**	.374**

These findings, which show a significant negative correlation on both the attitude scale and sub-scales, are in conflict with the findings of Serhan (2007), who found a link between school principals' positive attitudes toward technology and their support for integrating technology in the curriculum. Serhan reflected on his findings by saying: "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" (Serhan , 2007). Similarly, Akababa-Altun (2001) investigated the attitudes of 124 Turkish elementary school principals toward technology use and found that the majority of principals had positive attitudes toward technology. The main idea behind Altun's study, which is supported by evidence from previously mentioned research and consistent with the literature summarized in this study, is that whenever the individuals in leadership positions in schools are involved in the process of introducing technology into their schools, the process becomes easier. By introducing school principals to the different available technology resources and becoming aware of the role these resources can play in advancing their schools, they will assume an effective role in advocating and supporting the use of technology in their institutions themselves.

The results of the present study, which yielded weak negative correlations between school principals'

attitudes towards computers and computer use and their level of computer integration as indicated earlier, point to the widely accepted belief that attitudes can affect behavior directly or indirectly (Ajzen & Fishbein, 1980; Zimbardo et al. 1977). In the present research, the weak negative attitudes of school principals do not correlate directly with their level of computer integration, which ranged from low to moderate level as evidenced by the results of the present study. Similarly, school principals' level of computer use and integration, which does not correlate with attitudes, results in the development of a set of uncertain behaviors vis-a-vis technology integration in general and computer use in particular within Moroccan public schools. These behaviors can be changed, of course, once beliefs and attitudes have been identified according to the contexts they are in (Zimbardo et al. 1977).

In this regard, individuals' attitudes toward computer and computer use are more likely to change from negative to positive if they know the attributes or values of the technology used first (Rogers, 1995). Accordingly, a new technology will be increasingly adopted and diffused if potential adopters perceive that the innovation or the technology used has (1) an advantage over previous innovations; (2) is compatible with existing practices, (3) is not complex to understand and use, (4) shows observable results, and (5) can be experimented with on a limited basis before adoption. Being able to perceive these characteristics in an innovation or in technology such as a computer, users or adopters, be they teachers or school principals, will immediately develop positive attitudes toward that technology following Davis' Technology Acceptance Model (TAM) (1989). Moreover, acceptance of an innovation or technology depends first on "the tasks it is designed to support" (Dillon & Morris, 1996, p. 4), and then on users' perceptions regarding its usefulness and ease of use. According to the Unified Theory of Acceptance and Use of Technology model (UTAUT), acceptance is key to positive attitudes and to successful implementation and use of technology in schools and universities (Venkatesh et al., 2003).

According to Rogers (1995), peoples' attitudes toward a new technology such as a computer are a key element in its adoption and diffusion. For Rogers, the innovation-decision process and the development of an attitude of an individual (or other decision-making unit) pass through the following stages: "(1) knowledge of an innovation, (2) forming an attitude toward the innovation, (3) decision to adopt or reject the innovation, (4) the implementation of the new idea, and (5) confirmation of this decision" (Rogers, 1995, p. 161). In most cases and due to the novelty of computers and their related technologies, especially in the majority of developing countries such as Morocco, and because of the status of computers in education which is, to a great extent, still precarious and in its infancy, studies have mainly focused on the first two stages, that is, on knowledge of an innovation and attitudes about it. Conversely, the reluctance of teachers and principals to adopt and use technology goes back to their computer anxiety, lack of computer liking, lack of perceived usefulness of technology in education, and lack of perceived ease of use of technology tools (Totolo, 2011).

These factors, which represent four core variables that affect how well individuals utilize computers, seem to have a negative impact on attitudes. This is evidenced by the results of the present research obtained from the correlation analyses, which yielded negative correlation between the four attitude-subcales and school principals' level of technology integration. The evidence presented thus far supports the theory of Fishbein and Ajzen (Fishbein, 1979; Fishbein & Ajzen, 1975), which claims that beliefs about an object lead to an attitude toward it. These beliefs arise from experiences with the object, type of experience passed through with the object and what others have said about the object. When experiences with the object are favorable and consistent over a period of time, then stable beliefs about self-competence vis-a-vis the object are formed. In other words, when beliefs about an object are favorable or positive, attitudes also will be favorable and positive. When beliefs about an object are negative, attitudes will be also negative because beliefs about an object lead to an attitude toward it. According to Pelham (1991), if early experiences with the attitude object are negative, individuals

tend to avoid the object and consider competence with the object to be relatively unimportant to their self-evaluation. If negative experiences cannot be avoided, then negative self-perceptions of using that object will develop and will lead to negative attitudes.

Applying this logic to the present study, if some school principals' early experiences with computers and computer use were negative, especially in pre-service or in-service trainings they received, they may simply avoid them because they do not meet their expectations as far as the utility and practicality of technology integration is concerned. Therefore, they never would have developed strong and stable self-beliefs about their abilities to use computers and therefore their level of computer anxiety will increase, and level of technology integration and use will decrease.

In a study that examined age differences in the acquisition of word-processing skills, Czaja, Hammond, Blascovich, and Swede (1986) showed that many school principals changed their attitudes immediately after the training on computer and computer use once it was over. The obtained results showed that post training attitudes were related to the training experiences school principals passed through and their own positive performances in that training. Danowski and Sacks (1980) also found that the more an experience with technology is positive, the less fear and anxiety an individual can experience, and the more positive attitudes towards technology he or she can develop.

A similar conclusion was reached by Cody et al. (1999), in their study of Internet use among older adults. They found that people who spent the most time online had the least computer anxiety and high computer efficacy, and by the same token high positive attitudes toward computers use and technology adoption in general.

All these studies and the results obtained from the present research support the view that attitudes affect to a large degree the level of technology integration and computers use inside schools. That is said, computer anxiety, which is a core concept in the present research, highlights the fact that the less anxiety school principals have, the more technology they use in their institutions. This finding is also consistent with the literature provided in this study and support the findings of Weil and Rosen (1995) who found that low anxiety toward the use of technology determines an individual's high-belief and interest in usage of that technology and vice versa.

Being associated with feelings of uneasiness, frustration, self-doubt and apprehension, computer anxiety can be looked at as a fear of computers when using one, or fearing the possibility of using a computer (Chua, Chen, & Wong, 1999). In this sense, it is different from negative attitudes toward computers that entail beliefs and feelings about computers rather than one's emotional reaction towards using computers (Heinssen, Glass, & Knight, 1987). Following this line of reasoning, computer anxiety detracts users of computers from task performance and makes participants while using a computer ill at ease and behave with emotional fear of potential negative outcomes such as damaging the equipment or looking foolish while using a computer in front of other. Overall, many researchers consider that the reluctance of principals and also teachers to adopt and use technology goes back to their computer experience, anxiety, lack of perceived usefulness of technology in education, and lack of perceived ease of use of all the technological devices such as a computer (Kanfer & Heggstad, 1999; Totolo, 2011).

### **RQ 3: To what extent do school principals' age and administrative experience influence their attitudes toward computer and computer use in Moroccan public schools?**

#### **1- School principals' attitudes towards computers and computer use by age**

The analysis of Mean scores and Standard Deviation on CAS between respondents' attitudes based on age yield results which vary from one age group to another. The obtained results indicate that the youngest age group (36-40) has the least negative attitudes toward computers and computer use ( $M =$

22.75, SD = 11.11), while participants aged between 41 and 45 scored highest in Mean score (M = 32.11, SD = 8.31) as it is displayed in Table 6 below.

Table 6. Mean scores for Age Groups on the Computer Attitude Scale CAS

Variable	Age	N	Mean	Std. Deviation
Computer Attitudes	36-40	4	22.7500	11.11680
	41-45	9	32.1111	8.31331
	46-50	36	30.1389	5.95292
	Over 50	117	30.8718	8.03499

To explore the impact of age of school principals' attitudes as measured by the CAS and test whether the existing differences in age are significant or not, one way between groups ANOVA was conducted. The output of this analysis showed no significant differences between school principals' attitudes toward computer and computer used based on age since the sig value was over .05 ( $p = .195$ ). [ $F(3, 162) = 1.585, p = .195$ ] as Table 7 shows.

Table 7. Attitude difference based on age

Table 7: One-Way ANOVA for the Relationship Between School Principals' Attitudes Toward Computer and Computer Use and Age (Sig)					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	283.298	3	94.433	1.585	<b>.195</b>
Within Groups	9653.021	162	59.587		
Total	9936.319	165			

The results obtained from table 7 above indicate differences in attitudes between different age groups. The youngest age group (36-40) had the least negative attitudes towards computers, while the second age group (41-45) had the highest negative attitudes toward computers and computer use. This suggests that age affects attitudes toward computer and computer use to a large degree, and undoubtedly brings challenges for a generation born outside of the digitalized world, prior to the "Internet and screen age". Put differently, the more individuals get older, the more they develop negative attitudes towards computers and computer use and see it as a burden and a real challenge to overcome (Namlu & Ceyhan, 2002). Similarly, the more school principals get older, the more their computer anxiety exceeds and grows. This finding supports the findings of (Czaja & Sharit, 1998b) who studied computer experience among a community sample of 384 adults ranging in age from 20 to 75 years and found that older people perceived less comfort and efficacy using computers than younger people. Within this same studied community, older people showed less enthusiasm than their younger colleagues about taking advantages of computer opportunities and felt that their job security is not threatened by their lack of computer expertise, while younger individuals exhibited more familiarity with computers and were more eager to acquire new skills which may enhance their prospects for carrier advancement. This is in full agreement with the results of other studies supporting the fact that age may be considered as a determinant and contributing factor in negative attitudes toward computer

and computer use. It also plays a significant role in determining both the level of computer anxiety and the degree or level of technology integration (Baldi, 1997; Becta, 2004; Campbell & Wabby, 2003; Carpenter & Buday, 2007; Hayes, 2007; Mueller et al. , 2007; Rosen, 1995).

Similarly, this finding highlights the assumption or prejudices and stereotypes towards older people based exclusively on their age and reinforced by some common ageist ideas such as all older adults are cognitively impaired, unable to learn and/or uninterested in learning and exploring new things. Following this line of thought, ageism is associated with a number of prevalent negative attitudes such higher depressive symptomatology, lower life satisfaction, and lower self-efficacy, which are all factors that have negative influence on older school principals' decisions to use and integrate technology in school. This comes out, specifically, when these older school principals are not tech-savvy, and they are asked to use technology in their work as an obligation and not a choice. Following this line of reasoning, it is quite common, then, to hear continually from some of these school leaders, statements such as 'technology is for younger people', 'I am too old to use technology', or 'I won't benefit from using it. I have always lived like this' and 'you can't teach old dogs new tricks'.

Such expressions which are associated with ageism reflect the type of attitudes that work against the willingness and readiness to use digital technologies in general and a computer particularly in education or school management (can't do it; it's not for me; waste of time trying it...etc.). It follows, consequently, that the rapid digitalization of schools and the motivation of school principals requires and necessitates access to training and professional development opportunities first and digital inclusion programs or strategies to help this category of school principals get rid of ageist misconceptions and join the crew of change, second. According to Hope and Brockmeier (2005), technology training for school principals is vital if we need to have effective managers of technology in the school system. In a study that focused on the computer knowledge of secondary school principals, Witten and Richardson (1991) found that the majority of principals had little information about and almost no skills in using technology for instruction or management. They recommended, as a result, a full-scale training program for school principals. All taken together, by providing digital inclusion programs and introducing school principals to the different available technology resources, especially computers and the role they may play in facilitating their work and advancing their schools, they will, undoubtedly, assume an effective leadership role in advocating and supporting the use of computers in their institutions even if they are old and hold negative attitudes toward technology in general.

## 2. School principals' attitudes towards computer and computer use by administrative experience

The attitudes of school principals toward computers and computer use are also analyzed based on school principals' administrative experience or seniority as a school principal, as shown in Table 8.

Table 8. Mean Scores for Administrative Experience as a School Principal on CAS

Experience as a principal		N	Minimum	Maximum	Mean	SD
1-5	Principalship Experience	36	1	5	3.75	1.461
	computer attitudes	36	14.00	48.00	<b>27.6389</b>	7.99697
6-10	Principalship Experience	58	6	10	8.29	1.284
	computer attitudes	58	19.00	53.00	<b>30.8621</b>	6.17990
11-15	Principalship Experience	39	11	15	12.82	1.467
	computer attitudes	39	15.00	52.00	<b>32.5385</b>	7.97643
16-20	Principalship Experience	34	16	20	17.12	1.066
	computer attitudes	33	14.00	52.00	<b>31.0000</b>	9.06918

According to results attained from descriptive statistics and as it is displayed in table 8 below, attitudes towards computers and computer use of participants differ from one group to another. School principals with seniority as a principal that ranges from 1 to 5 years have the lowest mean score on the Computer Attitude Scale (CAS) ( $M = 27.63$ ,  $SD = 7.99$ ), while principals with an experience that ranges from 11 to 15 years have the highest mean score at the CAS ( $M = 32.53$ ,  $SD = 7.97$ ). Consecutively following this group is the group of school principals with an administrative experience that ranges from 16 to 20 years or more. This group has the second highest mean score on the CAS ( $M = 31$ ,  $SD = 9.06$ ).

In order to examine whether there are significant differences in school principals' attitudes towards computers and computer use based on experience in principalship, one way between groups ANOVA tests were utilized. The output of this statistical test revealed that there is a statistically significant difference at the  $p < .05$  level in the CAS scores for the four groups (experience in principalship) [ $F(3, 162) = 2.69$ ,  $p = .048$ ] as table 9 shows.

Table 9 One- way ANOVA for Relationship Between School Principals' Attitudes Toward Computer and Computer Use and Experience in Principalship (Sig)

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	471.425	3	157.142	2.690	<b>.048</b>
Within Groups	9464.894	162	58.425		
Total	9936.319	165			

Since the differences between groups are significant (1- (1-6), 2- (6-10), 3- (11-15), 4- (16-20)), post hoc comparisons using the Tukey HSD test was necessary. The results obtained from this test indicate that the mean score for group 3 ( $M = 32.53$ ,  $SD = 7.97$ ) is significantly different from all the other 3 groups. It is the highest mean score if compared to other mean scores of other groups, which do not differ significantly from each other ( $M = 27.63$  for Group 1,  $M = 30.86$  for Group 2, and  $M = 31$  for Group 4) as table 10 displays.

All things considered, the results of the present study suggest that attitudes towards computers and computer use vary from one group to another based on years of experience as a school principal. In light of these results, school principals with 1-5 years of experience had the lowest mean score on the CAS, while school principals with 11-15 years of experience had the highest mean score at the same scale. These same results were also obtained with the ANOVA analyses and the Tukey HSD test as indicated in tables 8,9 and 10. Similar to age-related studies and technology integration, studies on professional experience have revealed mix findings as well. The results of the present study suggest that novice school principals had more positive attitudes towards computers and computer use than their veteran counterparts. This finding supports Bebell et al., (2004), who found that participant teachers with one to five years of teaching experience had the highest level of confidence in using technology, followed by teachers with six to fifteen years of teaching experience, while teachers with over fifteen years of experience in teaching had the lowest level of confidence and the highest level of anxiety at the same time. According to Tezci (2009), Boulter (2007), and National Center for Educational Statistics (2006), teachers' limited use of technology is attributed to the accumulation of more years of teaching experience as well as limited knowledge of technology use. However, Niederhauser and Stoddart (2001) found no difference in computer use between experienced and less experienced teachers. Similarly, Ursava and Karal (2009) argued that teachers with more teaching experience have less computer anxiety and more positive attitude towards computers and computer use. That is said, teachers with less professional experience, use computers more extensively due to their desire to become more proficient in computer use. Following this same line of thought, Pamuk

and Peker (2009) found that older teachers are more technophobic than younger ones. Combs (2005) went even further to argue that the reason why experienced teachers are more technophobic in comparison to inexperienced teachers can be related to their unfamiliarity with computers as well as limited computer experience and use. However, and although novice school principals tend to be more cognizant of technology and computer use than their veteran counterparts, many challenges hinder their leadership practices as they become inundated in a complicated chain of administrative work (Atkins & Vasu, 2000).

Table 10. One-Way ANOVA For Administrative Experience as School Principals and Their Attitudes Toward Computer and Computer Use Score (Tukey HSD)

(I) Experience as a principal	(J) Experience as a principal	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1-5	6-10	-3.22318	1.62181	.197	-7.4332	.9869
	11-15	-4.89957*	1.76664	.031	-9.4856	-.3136
	16-20	-3.36111	1.84211	.266	-8.1431	1.4208
6-10	1-5	3.22318	1.62181	.197	-.9869	7.4332
	11-15	-1.67639	1.58285	.715	-5.7853	2.4325
	16-20	-.13793	1.66667	1.000	-4.4644	4.1886
11-15	1-5	4.89957*	1.76664	.031	.3136	9.4856
	6-10	1.67639	1.58285	.715	-2.4325	5.7853
	16-20	1.53846	1.80791	.830	-3.1547	6.2316
16-20	1-5	3.36111	1.84211	.266	-1.4208	8.1431
	6-10	.13793	1.66667	1.000	-4.1886	4.4644
	11-15	-1.53846	1.80791	.830	-6.2316	3.1547

\*. The mean difference is significant at the 0.05 level.

Having negative attitudes towards computers and computer use, as the findings of the present research revealed, are tightly related to the beliefs school principals had and developed towards that technology. They are not related to emotional reactions towards using that technology after all. These beliefs, which have developed from school principals' direct experiences with technology in general and computers and computer use particularly in in-service and pre-service trainings are expressed either as confidence and self-assurance or as fear, uncertainty and anxiety to use that technology. Confident, self-assured and non-anxious individuals believe that they can do well on challenging computer tasks, do advanced work with computers, perform well on a test about computers, and can avoid becoming intimidated by them (Loyd & Gressard 1984; Raub, 1981). In contrast, extremely computer-anxious individuals may develop negative attitudes toward computers and computer use, but may also use technology because they are obliged to do so (Emurian, 1989; Shore, 1985).

Applying this logic to the Moroccan context, Moroccan school principals' negative attitudes towards computer and computer use emanate from their dissatisfaction with the way technology in general and computers are integrated in the whole Moroccan educational system, and the way they are employed in pre- and in-service trainings and professional development programs. The integration of computers into Moroccan schools has not been fully guided by a nation-wide shared strategy to integrate technology in schools. The technology implementation plans and programs that existed (GENIE Program as an example) seem to be lacking consideration of school principals' involvement in decision-making regarding the planning and integrating computers into schools. Whenever an individual in a leadership position in schools is involved in the process of introducing computers into schools, the process becomes obviously serene or trouble free. Accordingly, any inattention to school leaders'

attitudes and any type of exclusion from being involved in the process of planning and setting a vision of computers integration in school, may engender unforeseen repercussions for technology diffusion and integration in schools.

Contrastingly, when school principals feel involved and helped to realize personally the possible applications of computers in education, then they can help facilitate their introduction and integration into schools and incorporate them into the curriculum since they feel comfortable using them themselves. According to Nance (2003), school principals should have some level of participation at all levels of the policy enterprise since it is they who will be ultimately responsible for the implementation and success of any school-related technology endeavor or initiative within the school. Unfortunately, decision makers overlooked the psychological and contextual factors involved in the process of educational computerization, which vary from one principal to another and from one context to another as well (Clark, 1983; Thompson, Simonson, & Hargrave, 1992).

Faced with this situation, school principals are put between the devil and the deep blue sea since the process of change in Moroccan schools is still shrouded and obstacles and setbacks are still the norm in a number of public schools. Within this context, school principals are obliged to use computers that become evident and forcibly inescapable to initiate and carry out administrative and pedagogical leadership roles inside schools. The computerization of schools and the introduction of school management information systems (SMIS) such as MASSAR (a complete program that provides a full and comprehensive data used by school principals, assistant administrators and teachers to manage exams and evaluations) and MASIGH (a complete program that allows principals' to follow and control teachers' behavior, attendance, performance, ...etc.) put even much pressure on school principals to learn to use computers to update the school's database for (SMIS) report production, and to deal with directives, guidelines and instructions that are diffused daily and more rapidly and directly from the Ministry of Education (MoE) and its regional and local offices. Accordingly, this pressure had many negative effects on school principals' attitudes towards computer and computer use and highlights the widely held view that as technology evolves and computer use spreads, administrator skill sets must change to remain current and updated (Jerald, 2009).

In brief, the results obtained from this study highlight the point that school principal's attitudes toward computer and computer use were negatively associated with their experience as school principals. That is, as they had more experience as a principal, they were less likely to develop positive attitudes toward computer and computer use. This interesting result may be due to lack of knowledge and skills regarding computer-based or computer-managed or assisted instruction (CAI) (EDUCAUSE Horizon Report, 2022), or lack of enough training for effective ways of using computers for instruction and management purposes inside schools. Put differently, school principals with more experience as administrators were less technologically prepared and less ready for a strong computer use compared to those with less years of experience in principalship.

## **5. Conclusion and Recommendations**

The purpose of this study was to investigate the relationship between school principals' attitudes toward computers and computer use and the impact this has on level of computer integration in Moroccan public schools. Based on the results of this study, attitudes, which are critical factors because the increasingly performance of school principal appraisal is tied to measurable school improvement, play a major role in the process of computer use and technology integration into schools. Evidence from the obtained results suggests that when school principals hold negative attitudes towards computer and computer use, this impact directly the integration of computers into schools, and as matter of fact, school principals exhibit negative reactions ranging from "mild discomfort to extreme avoidance" (Todman, 2000). Contrastingly, when school principals' attitudes towards computer and

computer use are positive, they serve as a filter through which school principals take in and apply relevant information and accept the use of computers without fear, hesitation and/or anxiety. Put differently, principals' positive attitudes towards computer and computer use can play a significant role in overcoming the various impediments that may occur during the integration process in schools and can spread to the teaching faculty in the school and hence to the classroom and the students. The different statistical tests used either with the attitudes scale or the four attitude-sub-scales support this overarching claim and indicate that there is a weak negative relationship between school principals' attitudes towards computer and computer use and their level of computer integration.

Similarly, the attitudes toward computer and computer use of school principals based on age revealed that the youngest school principals (aged between 36-40) had the least negative attitudes toward computers and computer use. This highlights the commonly believed view that age has a huge influence on attitudes and can impact the readiness and motivation to use a computer and integrate technology into schools. However, when it comes to the length of the working professional experience or seniority in principalship, the results obtained revealed significant differences between school principals in terms of their attitudes toward computers and computer use as well as their level of technology integration into Moroccan public schools.

To drive home the points, and in light of evidence from previous research and results obtained, it seems that the present study is significant and has its potential values and implications in a number of ways and levels. First of all, the study comes to fill in an existing and apparent knowledge gap in the literature related to attitudes and computer use among school principals. In Morocco, there is a dearth of research dealing with this issue since previous research targeted only teachers and students' attitudes toward computers and computer use in schools, neglecting accordingly the pivotal role of school principals in this endeavor. Therefore, this investigation has implications for policy, research, and practice.

Decision makers, to begin with, should consider increasing the number of training programs, workshops and professional development opportunities to help raise school principals' interest and build their leadership skills and confidence in their abilities to use computers in schools and classrooms and therefore facilitate their adoption as a new component in a new school culture. Decision makers should also consider reviewing the educational system which is generally described as a bureaucratic system since it is based on the concept of graded authority or hierarchy in leading and managing schools. Because of this bureaucracy, school principals mostly serve as obedient servants inside schools and work tirelessly on the implementation of official notes as dictated by the Ministry of National Education and its offices at the regional and local level. This situation influences school principals' attitudes toward computers use and limits all types of personal initiatives to initiate change inside schools. Similarly, decision makers should find reasonable ways and efficient means to solve the problem of some school principals' resistance to change by valorizing their role in the making of change inside schools, giving them incentives and provide them with moral and material support, especially now that the institutionalization of change is inevitable as education systems globally lead under the impact of socioeconomic internalization, digital technology advancement, as well as demographic reallocation (Fullan, 2007; Giddens, 2013).

Similarly, and being on-site educational leaders who shape and communicate visions of teaching and learning within their schools, school principals' role in effectively leading the integration of technology into schools has been recognized by professional organizations such as the International Society for Technology in Education (ISTE, 2002) where National Educational Technology Standards (NETS) for school principals have been described and specified. These standards have been developed to assist school principals in identifying the competencies they need to perform their role as technology leaders in implementing technology into the schools and underscore their need to initiate, promote, and support

the effective use of technology into their educational environments. Having all these advantages in facilitating the development of technology plans intended to promote the effective use of technology and to aid administrators in implementing technology strategies that will improve their school's efficiency, effectiveness, and productivity; Moroccan decision makers should develop similar standards for Moroccan school principals and provide them with intensive training programs to help them learn the practice of leadership and the communication of a vision of the role of technology in teaching, learning and school management to all stakeholders, develop a long range technology plan, initiate and support professional development processes inside school that encourage effective use of technology in teaching, learning and administrative functions, create a learning environment that empowers school staff to use technology and finally communicate legal and ethical issues as they relate to technology integration into schools. In simpler terms, decision makers should make use of these international standards to guide the redesign and development of new graduate courses for school administration programs.

The second issue that underpins the importance of this study concerns gaining a deep understanding of the extent to which a particular theory and/or research strategy “fits and works” (Taylor, Bogdan, & DeVault, 2016, p. 157) in different social and educational contexts. The generalization of the knowledge about the issue of computer use, school principals' attitudes and level of computer use and integration in Moroccan public schools can be strengthened only when insights and evidence are gained from as many different contexts as possible. For this reason, and although this study was conducted in the Moroccan context, the issue investigated and the results obtained are not limited to only Moroccan public schools, but also provide data, knowledge, resources, techniques, and perspectives that may resonate well with other similar contexts. The results can also serve as a guide in assessing school principals' attitudes and help prioritize and develop curriculum and training programs for school principals to support computer use and integration into schools.

Finally, it is anticipated that the results obtained from the study will open new lines of inquiry in research about the crucial and critical roles of school leaders in the use of computers in schools in developing countries. Schools nowadays are in the transition of re-culturing to accept teaching and managing schools with information and communication technologies (Otto & Albion, 2002). Therefore, future research should investigate further school principals' perceptions of the level of their computer use, leadership styles, computer competence, age, gender and technology leadership. These variables have been less investigated, therefore more research is needed to explore the various aspects of these factors in terms of cultural, national, political and educational decisions in integrating computers in Moroccan public schools.

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