

Technology-Capable Teachers Transitioning to Technology-Challenged Schools

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Abstract: Developing countries lacking capabilities, funds and human resources are compelled to improve the digital literacy rates of their task force through educational initiatives. This is the case of Tunisia where a stand-alone in-service teacher education (Ted) initiative was implemented in 2014 and 2015. The aim of this project, the Tech Age Teacher Project (TATP), was to equip teachers in Tunisia with the technology skills for teaching so that they can dispense teaching of a 21st-century education quality. Five English language teachers, who benefitted from this initiative, are the focus of this study. The aim was to explore whether and how they are making the transition into the technologically-challenged schools. Analysis of the TATP documents, data is collected through a short teacher questionnaire and a semi-structured interview during which teachers give their personal accounts as TAT trainees and their attempts to apply the ideas in real school settings. Results indicated that teachers showed great dedication toward implementing the ideas/skills received in the training and that they strove, as technology-capable teachers, to integrate technology in their day-to-day practice despite the constraints they faced in the schools. Their accounts reveal their rationale and motives for using technology with their students and the strategies they employ to circumvent obstacles, but also show that their success in integrating technology remains restricted by issues of infrastructure, barred access to a technology space, learners' "playful" attitudes, etc. The findings highlight these teachers' resourcefulness and sense of mission as to transforming their learners' learning experience and changing their attitudes towards technology use and to fostering 21st-century education learning goals. The paper concludes with recommendations for future initiatives to (re)design and (re)orient the goals of the initiative towards supporting these teachers' learning processes as they make the transition as technology-capable teachers into the technology-challenged schools. Recommendations are made for the emerging professional community of technology-capable teachers to build a networked community of practice likely to foster these teachers' reconstruction of their professional knowledge and skills and to facilitate the dissemination of ideas on the integration of technology in education.

Keywords: teacher technological pedagogical knowledge, 21st-century skills, low-technology context, teacher transition to e-learning, technology integration, professional networks, Tunisia

1. Introduction

In the title of this paper, which focuses on teachers who benefitted from an in-service initiative to empower them with technology skills, the Tech Age Teacher Project (TATP), reference is made to "technology-capable teachers" and "technology-challenged schools". The title encapsulates the idea of a paradoxical situation, but not specific to Tunisia. The reverse is also possible as in some contexts, the schools are technology-rich but the teachers are untrained or do not use the technology available (Teo, 2011; Stevens, 2010; Cuban, 2001; Becker, 2001). Tunisia, the setting for this study, has recently been recognized in reports by the International Telecommunication Union (ITU, 2015; ITU, 2014) and the African Development Group (African Development Bank Group, 2014) as a pioneering country in Africa provider of telecommunication technologies. In earlier reports (Hamdy, 2007, pp. 7-8), there was mention of an "Internet for All" project in 1988 and an Education Act in 2002 which mandated the installation of infrastructure, provision for computers, internet access and teacher training. This trend was consolidated in 2006-2007 by introducing a compulsory computer literacy course ("*informatique*") in all public schools starting 7th form of Basic Education. Hamdy (2007) also cited a series of projects meant to be completed by 2009, such as reaching a level of one mobile computer per classroom, high levels of integration of technology in teaching, provision of mobile laboratories (internet buses) to connect rural schools and web presence for educational institutions. As it turned out, these projects were no more than a wish list that never materialized, as revealed by formal and informal reports on the status of technology in schools. For instance, Lachheb's (2013, p. 40) survey of 35 English majors in one institution revealed that 58% of these students reported using computers and the internet for learning at home but could not rely on the equipment and infrastructure in the university to do work in class. Klibi (2014), who surveyed 35 secondary school teachers of English, found out that 52% of the teachers reported that they never used the multimedia labs or the language learning software purchased by the Ministry for the teaching of listening, speaking and pronunciation. When asked about the obstacles standing in the way of technology use in schools, teachers named shortage of equipment, maintenance issues, unreliable internet connection, large classes, and fellow teachers' reluctance to use technology (due to lack of technological skills and training

opportunities). These MA level studies, though small-scale, depict a challenging situation. The TATP is to be situated in this school context which does not keep up with the 21st-century changes. It will be interesting to delve into this specific and challenging situation where teachers return to the reality of the schools where they are working.

2. Background to the Tech Age Project

This paper probes the situation of five teachers who in 2014 took part in the TATP, which was an initiative implemented by the International Research and Exchange Board (IREX) and funded by the Blue Mountain Foundation (BMF) in collaboration with the Tunisian Ministry of Education. The TATP was launched in 2014 on the eve of the constitution of the first democratically-elected government after the "Jasmin Revolution" of 2011. Thus, the initiative was introduced at a time when people were hoping for a long-awaited reform of the system of education, identified as lacking in quality and being disconnected from the world of work (African Development Bank Group, 2014).

2.1 Project Design

As stated in the IREX curriculum documents, the project would start by recruiting 200 educators and then expected to yield 25 highly-trained technologically-capable teachers after the nine months of a training session each year. This nucleus will be "passing on their skills" to their students and fellow teachers even though there seems to be no provision made for this nucleus to be certified by IREX (or any other body).

The TAT programme was administered in four phases (see Appendix 1): a selection phase, a quarter-final phase, a semi-final phase and a final phase. The labels used to refer to the phases indicate that the program is selective so that only 25 finalists stay on. The instruction begins, as indicated in the description of the content of each phase, from the acquisition of basic to more advanced skills. The finalists receive 80 hours of intensive training in setting up virtual communication, using freeware, web design, and sophisticated multimedia presentation tools.

At the end of each phase, teachers have to complete an assignment. For instance, at the end of the basic skills phase (the quarter-final phase), trainees are required to create "a lesson plan centered on students." Following the semi-final stage of training, however, the assignment was more complex and school-based:

Each teacher will be asked to train 10 of her students on educational technology that they learned themselves from (the) TAT project. As a result of those trainings, as a group, teachers with their students will need to create a digital story about their schools, create an online presence for their school through social media and submit it for evaluation.

The assignment in this phase is more complex in nature and presents an opportunity for the trainees to interact with the students and "face" the technology-challenged situation in their schools.

A close examination of the four objectives stated in the curriculum document leads to the conclusion that three are strictly related to training teachers while one (the second) refers to the possible long-term impact on learners: "Give youth new, 21st-century skills that are invaluable in a developing economy and increase their future employment prospects." The three other objectives, focusing on the teachers *per se*, read: "perception and ability to use the internet", the "skills and methods to meaningfully integrate 21st-century technology into [the] teaching process" and "develop leadership skills, community needs awareness, and intellectual creativity of teachers and engage them in their communities." As for the first two, they emanate from a widespread, though challenged, conceptualisation of teacher-technology learning as encompassing "understanding" and "technical skills" with the expectation that the trainees will interconnect them later in the classroom (Hanson-Smith, 2016; Kessler, 2016; Torsani, 2016; Grenfell, Kelley and Jones, 2003). The third, however, can be understood as hoping for these trainees to play a leadership role as innovators. The TATP is ultimately anticipated to produce the kind of change in teachers that will enable them to connect with 21st-century education ideals of teaching/learning.

2.2 Implementation Procedures

The training took place in selected schools and twenty regional Centres for Continuous Teacher Training (CREFOCS). IREX recruited and trained regional coordinators certified Information Technology Teachers (see Appendix 1). As such the project was given breadth (rather than depth) by ensuring cross-regional and cross-subject coverage (Hubbard,2008). The course was delivered by Tech Age Teachers Regional Coordinators (TRCs) who were trained and "certified" by IREX. The logic was:

Since TRCs will have technology skills and knowledge it will not be necessary to train them on basic computer and internet skills, but rather help them understand how technology and the internet can be integrated usefully into education and training. TRCs will learn how to create and facilitate digital dialogue and networking with classrooms in Tunis. Modules taught at the ToT (training of trainers) will be accompanied by easy step-by-step guides that walk TRCs and teachers through the different stages of projects, and FAQs answering common questions about application of different tools...

While decisions to use technologists to teach the technical skills was not unusual practice in the field (Hubbard , 2008; Bakir, 2016), it is not clear how TRCs can, following a brief induction, be entrusted with discussions around themes like "student-centered training methodology and the role of technology ", "ICT in education and trends in schools around the world", "understanding how social media is used by educators around the world."

In the semi-final stage (Appendix 1) total focus is put on the technical aspect. Instead of practicing the integration of the technology in situated learning format, the trainees are side-tracked to work with a small number of students on creating an online presence for their school. To be fair, having the teachers "pass on" the skills to their students can be an insightful experience for the trainee teachers but two "wrong" messages are embedded: first, selecting 10 students (whatever the reasons/criteria) would mean choosing who gets to participate. Second, that technology is an add-on and an extra-curricular activity.

In the final phase of the TATP, the trainees are asked again to create "lesson plans" and "materials" in small teams. There is value to the exercise as it enables the trainees to learn from each other, and perhaps, focus on choices specific to their own school subjects. However, it will make more sense once implemented in a real lesson. Thus, there is no emphasis on deepening the trainees' situated knowledge of the tools and software. Submitting a lesson plan for evaluation is no indication of mastery of technology integration in teaching (Teo, 2011; Hsu, 2016). The TATP participants will have to create the necessary connections and make the pedagogical shifts in their practice once back in the schools without the necessary mentoring (Slaouti and Motteram, 2006). It is this intriguing aspect of the post-TAT experience that motivated this study.

The critical analysis of the TAT curriculum is based on the author's inferences based on what is stated in the IREX produced document. It is not meant to underestimate the initiative. It is, in fact, a bold and admirable attempt to upgrade the professional level of teachers despite the short-lived nature of the funding (discontinued in 2015). The TATP will go on record as a life-altering experience for many of the participants. The objective of the study is to explore the transition that teachers may be undergoing a year after the course. In this sense, an exploration of its goals, pedagogical orientation and delivery mode were a first step towards reaching an understanding of the initiative. In fact, studies in varied contexts (Becker, 2001; Teo, 2011) pointed to a host of interconnected factors influencing teachers' decisions to use or not use technology and their level of success with the integration of technology. These include length of experience, availability of technology, ease of use, and suitability to the learners' learning objectives (Becker, 2001). However, exceptionally enthusiastic teachers, like the ones participating in this study, need to go out of their way to engage in technology use due to the challenging situations in their schools. Limited resources in Tunisia and elsewhere (Egbert, Paulus and Nakamichi, 2002; Yildiz, 2007) can hinder the teaching of 21st century skills in the schools. How teachers can acquire, sustain and refine their technology skills if they and their students have such limited options (Goodwin-Jones, 2015; Hockly, 2014).

It is against this background that this study focuses on examining how five TATP trainees cope once back in the school context. Thus, the general aim of this study is to explore how these teachers manage, if at all, to transfer what they have learnt and how they reason about implementing technology-supported instruction in their work situation. Previous research on teacher learning showed that the trainees' knowledge is constructed

and refined in-action (Freeman and Johnson, 1998; Schulman, 1986). Carrying over the idea of knowledge growth to teachers learning to use technology, research is pointing to the need for these teachers to expand their pedagogical knowledge and develop expertise in integrating technology through experience whereby old and new knowledge are merged in day-to-day practice (Chao, 2015; Tai, 2015; Messina and Tabone, 2012; Wong and Benson, 2006; Meskill et al., 2002).

3. Place of Technology in Teacher Education

Ideas on how best to educate teachers to use technology changed over time (Bakir, 2016 ; Torsani, 2016; Farr and Murray, 2016; Compton, 2009; Hubbard and Levy, 2006). Teacher educators tended to produce training textbooks and support materials for classroom teachers and teacher educators which included explanation of how theoretical frameworks can underlie practice (e.g., language learning methods, Second Language Acquisition, or learning theories). Social networks were also launched so that teachers access knowledge about CALL through collaborative processes (Hubbard and Levy 2006, pp. 6-7).

Descriptive and research-based reports on existing pre-service and in-service technology training courses indicate that three dimensions are generally covered: technology, theoretical knowledge and field experience (Lambert, Gong and Cuper, 2008; Slaouti and Motteram, 2006; Wong and Benson, 2006) but decisions about what type(s) of knowledge, what technology tools to select and what sequence to follow can be hard to make. For instance, Hughes (2004, pp. 347-355) proposes designing "technology integration" courses around four guiding principles:

- Connecting technology learning to professional knowledge,
- Privileging subject-matter and pedagogical content connections,
- Using technology learning to challenge professional knowledge, and
- Equipping teachers with skills in using many technologies.

Meskill, et al. (2002), who compared the "technology talk" of novice and expert teachers, concluded that novice teachers needed more time and hands-on application of technology than experienced teachers to work out the place and role of technology in their teaching. The researchers pointed out that experience matters; teachers need to go through "sequential transition" as they learn how to integrate technology by resolving issues related to classroom management, appropriateness of teaching approaches, and of technology tools. Wong and Benson (2006, p. 263) point to the issue of how individual teachers' beliefs about teacher control and learner role(s) in the learning process determine the level of success in integrating technology. Thus, the potential for training to transfer to the classroom may be limited, as Robb (2006, pp 331-340) explains. For instance, the content of a course may not fit the trainee's teaching assignment and the tools provided at university may not be available, the institution (or its administrative leaders) may not value technology and student and teacher perceptions may differ on whether and how the technology is meant to help in learning a specific school subject, and so on. To increase chances of technology training transfer, Peters (2006), for instance, describes a solution adopted in Quebec whereby teachers acquire first the basic technological skills and then practice technology integration by undertaking situated teaching projects. As is the case in Robb's (2006) study, student teachers felt that the timeframe of a semester course was not sufficient for experimentation with technology integration in classrooms, and therefore, being technologically-capable did not make them automatically successful in integrating technology in their teaching.

Thus, studies of the type persuaded universities that a better option was to integrate technology throughout their programs. For instance, a solution adopted by the University of Quebec consisted of introducing a webfolio (an electronic portfolio) requirement that student teachers needed to maintain over the four-year course of study. They also launched an online forum for the trainees to share their ideas and showcase online the projects they had created and receive peer feedback. Thus, the choice of infusing technology throughout the program instead of having a separate standalone course is believed to help cultivate an integrationist view of learning with technology in the teachers and their learners. Illustrative examples of this integrative approach are described by Slaouti and Motteram (2006) and Foulger, et al. 2012.

Slaouti and Motteram (2006, pp. 82-83) describe the attempt to reach a level of technology integration in the MA TESOL program at Manchester University. The four technology modules: Computers and Video in the Language Classroom, Computer-Assisted Language Learning, Multimedia in Language Education, and

Computers, Language and Context are designed by drawing on Schulman's (1986-1987) views on teacher knowledge, and views of teacher learning as construction of experience and the outcome of reflection (Freeman and Johnson, 1998; Zeichner and Liston, 1996; Shavelson and Stern, 1981). To facilitate integration, a computer-mediated tool (CMC) was infused in the fourth module whereby students were required to post narratives of their situated practice assignments, describe their rationale and justify their choices when designing teaching activities. As a result, student trainees are "compelled" to share their reflections with fellow trainees. The program developers were hoping, by adopting this delivery mode, that student teachers' "Technological Pedagogical Content Knowledge" (TPACK) would develop as part of the exchanges as anticipated by Koehler and Mishra (2009). TPACK is then an expansion of Schulman's (1986-1987) model.

The TPACK continues to be explored in technology courses to tease out how these areas of knowledge are combined. Of interest is Charbonneau-Gowdy's (2015, p. 237) work in which she evoked similar reasons for infusing online communication and networking tools (class blog, Skype, cell phones, web-based input, and group emails) in a TEd course in Chile. Messina and Tabone (2012) provided confirmation for the process of teachers making connections in-action. Similarly, Tai (2015) illustrated how the TPACK framework could be used to design courses and to assess in the meantime the trainees' abilities to integrate the knowledge areas and technology skills. Many "new trends" are emerging in the field emphasizing situated learning and collaborative knowledge construction (Hanson-Smith, 2016; Kennedy, Latham and Jacinto, 2016; Torsani, 2016).

Social networks and global professional communities are capturing the imagination of self-directed teachers as personalised open systems of continuous professional development (CPD). Kennedy et al. (2016) reported, based on analysis of a Research Gate (RG) online discussion corpus, that the general mood in the RG discussions shows that every teacher can participate in free webinars and subscribe to specialised expert communities where they can exchange ideas with "expert" and/or "novice" professionals, ask questions or seek help. In these virtual spaces teachers become self-regulated learners, possibly designing their own CPD programmes. University-based courses and standalone modules are nowadays constructivist in approach with focus on the transformation of practice through situated design and implementation activities (Torsani, 2016, pp. 120-121). According to Bawane and Spector (2009, pp. 385-395), a number of changes in the roles of online teachers have been occurring such as building a community of learners, sustaining the interaction, increasing student participation, modeling for them online interaction, and the list is not exhaustive, require a new set of competencies, a different response from teacher educators so that the focus is on infusing the tools, skills and experimentation with performing these new roles.

I have overviewed previous and emerging approaches to teacher technology education and pointed out that teacher educators are (re)imagining and (re)designing curricula, opting more and more for the integration of technology and the creation of networked environments and mixed spaces, leaving room for teacher trainees to explore personal learning paths (Kennedy et al., 2016; Torsani, 2016; Bauer-Ramazani, 2006).

4. Research design

The study was carried out following a naturalistic ethnographic perspective (Hammersley, 1992). It started with collecting peripheral information about the TATP and connecting with the wider population of teachers benefitting from the initiative. An invitation to the Tech Age Teachers Facebook page helped the researcher follow the second group of TAT as they were undergoing training. There were posts about training sessions taking place in the different districts, images of pupils working around computers, the creative work they produced and of officials visiting the training sites. The second step consisted in analyzing the TAT curriculum and collecting empirical data from the participants (see Section 3.1).

The goal was to delve into the experiences during and beyond the training they received and the transition back to the schools and day-to-day practice. Questions guiding the research include:

1. Whether, and how, teachers are managing to transfer skills from the training to the teaching situation?
2. What strategies are teachers using to implement technology-supported teaching within the constraints of their respective schools?

3. Whether, and to what extent, teachers are able to sustain and expand their skills as technologically-capable teachers?

A short questionnaire was used to collect information about the participants' profiles, school situation, previous technology training (see Appendix 2) and followed by a semi-structured interview targeting more specific information about the TAT experience and to verify whether and to what extent they were able to transfer the ideas to the school context. Thus, the design followed a funnel technique delving deeper into the teachers' personal accounts.

4.1 Participants

Five English language teachers (three female and two male, aged between 25 and 35 years) were approached to take part in the study. They were all teaching in public schools and, except for one, had more than 10 years of experience. A technique of purposive sampling was used so that only English teachers who had participated in the TATP were approached.

4.2 Data Collection and Analysis

The data collection started 18 months after completion of the training. In light of their responses, a semi-structured interview protocol was developed to probe the teachers' knowledge construction and detect instances of transfer of learning in the context of work. Their implicit and explicit theories about teaching with technology emerged with reference to a specific teaching situation (Freeman, 1991). The participants were interviewed via Skype and *VoiceThread* (for one), saved as MP3 files and transcribed.

5. Results

A case study analysis technique was adopted whereby the ideas were examined across-case (Yin, 1994) in search for convergence and/or divergence, and patterns and evidence for conceptualization of practice. This process of making sense of the data (Patton, 2002) helped the researcher pinpoint the teachers' lines of arguments, beliefs, and attitudes while remaining sensitive to any arising diverse positions.

5.1 Teachers and Technology

The five teachers' "stories" with technology began long before the course. Participants described themselves as "computer literate", "computer savvy" or "skilled in using computers". Maya, the youngest participant, reported having used *Encarta* CDROMs for self-study as a pupil. She learnt how to edit videos with her brother using the family laptop. Maya, Nora and Hassan also reported benefitting from courses on technology use provided by the Ministry of Education but found them sporadic and too limited in scope. As for their use of technology for teaching prior to the TAT experience, they felt it was "simplistic" and "not integrative" (Maya, Nora and Helena). They joined TAT because they felt the need to boost their professional skills so that they could innovate and motivate their pupils. They indicated that they, as teachers, were feeling low, sensing that their pupils were disaffected with school and the "old ways of teaching".

5.2 The TAT Experience "Transformed my Teaching"

Thinking back about the TAT experience, the teachers admitted that even though they had used technology in their personal lives, they felt, the TAT training helped them "transform" their teaching. For example, Maya described her initial attempt as teacher-centred and transactional :

I used to use the technology just in the form of a Powerpoint presentation as a tool to present ideas or concepts in a Powerpoint or include videos. This was a very simplistic use actually with zero interaction from my students. I was in control.

Helena, on the other hand, mentioned that she used to just use videos that her husband had downloaded for her. As such the TAT experience helped them step into new roles as teachers. The questionnaire data indicated that they had learnt, each in his/her own way, to incorporate software use, develop multimedia materials, select curriculum-specific audio and video input, use Web 2.0 tools to create learning opportunities for their pupils (esp. Ramy, Maya and Helena) and coach them in technology clubs after school (Hassan, Nora, Maya and Helena).

They also highlighted the need for setting new educational goals that incorporate technology use. Helena explained: "We (will) teach the students the same skills we were taught and help them be 21st-century students and use technology to communicate and to collaborate with others." Nora, Maya and Hassan insisted, especially, on fixing the learning objective(s) justifying the introduction of technology tools and expressed concern over prevalent "negative" attitudes they observed among learners when using technology in the classroom. Some of their pupils "only conceive of the technology as a futile entertainment tool" (Helena) or "just seize the opportunity to check their FB or email" (Hassan) instead of doing work. The five participants talked about the issue and showed determination to correct what they considered to be the "negative perception of technology as entertainment within the Tunisian educational culture" (Hassan). They felt they had to install in pupils new habits of using technology for learning. Nora mentions teaching her pupils "how to create their own quizzes, questions about a comprehension text (using *Hot Potatoes*) or how to edit images they can use to explain a vocabulary word or concept". This type of involvement, she explained, will focus their attention on what she calls "good use of technology". For instance, she mentioned employing a rotation system so that each was given a chance to experiment:

...[S]ome do the drafting and the others can use the laptop to create a Powerpoint presentation for the project. One time I gave them the camera and told them to take pictures while the others could use the microphone to record themselves.

It is clear from the teachers' accounts that they were careful with the implementation of teaching technology-supported activities. Planning and managing the activities, they are mindful of the "real learning potential of technology" and the level of involvement of the learners. Hassan and Ramy pointed out that integrating the tools, content and type of learning activity is what makes a lesson technology-rich and successful; not the technology itself.

Another distinctive feature of the participants' practice was flexibility and caution. Nora said she could change her objectives around if need be and Maya that she could find a way to always have some aspect of technology present in her lessons. Helena mentioned that she was able to troubleshoot and solve the problem of connection. Hassan was also weary of fads and fashions; introducing pupils to *Scratch* was not a priority from a language learning standpoint. He believed that language teachers should always focus on teaching language with technology and only use the essential tools. For instance, he preferred to compile materials and bring them on CDROM for class use but said he had experimented with using mobiles by running a texting competition, doing a simple search and allowing pupils to access the group's Facebook page to consult the teacher's post that day. Hassan had to skilfully blend face-to-face and online work. He only relaxed his grip on technology when the risk of students engaging in "off-task behaviour" was reduced: "The challenge is to make them aware of the educational uses of the devices". Nora, in contrast, believed that if her pupils developed sufficient familiarity with technology tools, they would pursue learning on their own. Ramy was also relaxed about putting technology in the hands of the students. He encouraged the pupils to bring their own mobile phones or laptops and supplemented with communication through a class FB page. He argues: "students have sophisticated tablets, mobile phones, and laptops at home and they go to the internet cafés, so why not use [these affordances]?" He said pupils never complained about being given work to do with technology use whether in class or outside it.

A third feature of the transformative power of the TAT experience can be what the participants report as their ability to create activities using their own teaching materials and to put pupils in an active role as learners who create and share with others what they have created. Maya explained:

....Now I can create interactive activities or a video-based lesson when the students can interact with the presented materials and get involved in further discussions. I also encourage my students to create digital stories, Powerpoint presentations, short animations related to whatever topic we are dealing with.

Likewise, Nora related how she used media and technology to motivate learners and involve them in creative work: "I try to have them watch videos and respond to the content in speaking or in writing. I have them sing along famous songs just to encourage them to speak and the like."

5.3 Strategies for Technology Implementation and Integration

As mentioned earlier, the interest was in exploring whether and how the participants made the transition back into the former technology-challenged situation. It appears that the technology situation differs from one school to another. Except for Helena, who was in a TATP selected school, the other participants complained about the poor infrastructure, inability to access the computer lab or check out an LCD projector and the lack of cooperation on the part of the administrators to allocate a special classroom or set up a club. Nonetheless they were optimistic about the prospect of change. Hassan said he just needed his laptop and wireless mouse and stressed the fact that all twelve English teachers in his school were, indeed, using technology against all odds: "We are using our own equipment and bringing our own devices and encouraging our pupils to bring their own devices. We are advancing slowly but there is change". Along similar lines, Helena reported that the TAT training equipped her with the skills to troubleshoot and solve technical problems should they arise: "I would not worry if there is no internet connection. I have my mobile phone with which I can share the connection. I bring my computer and my students bring their own computers."

To sum up, the data indicates that the participants are generally able to vary the use of teaching strategies and allow a more learner-centred approach when assigning project work and collaborative tasks. Helena and Maya report intervening only when the pupils ask for help. The teachers mention suggesting online dictionaries, authoring and presentation software and collaborative spaces and leaving learning to evolve in the process. They also require participation in discussion about the topics in the lesson, selection of materials to supplement the textbooks, and downloading materials for the class blog.

5.4 Commitment to "Passing on" Their Skills to Others

Clearly, the participants conceived of the TATP as an opportunity to spread technology use in schools and showed commitment to passing on the skills they had learnt to their pupils and colleagues. Helena expected the TATP to have a snowball effect:

...Tech-age teachers must be active in their community and give a good example [and] pass their knowledge (and skills), not only to their students but to their colleagues and these colleagues pass them on to their students and so on.

Other participants were rather disappointed to see that skills earned over a demanding nine-month in-service course were neither accompanied by incentives, nor promotion into the (even informal) role of "technology specialists". Hassan complained:

... I use technology, I do my best...I have these heavy bags with me all the time. Then what is the difference between me and someone who never does anything? Of course, there is gratification. My students love it and we laugh about the clips we make but in the end what's the difference?

Based on the teachers' accounts, informal discussions with them and inferences upon examination of their Facebook pages, it is clear that they are lifelong learners wanting to sustain their professional learning as technology-using teachers. They have joined professional groups on social media, been taking courses online (e.g., e-teacher program), participating in national competitions (e.g.: Innovative Teacher Competition), and giving workshops at local and national conferences. Hassan mentions taking an online course as part of "*The English Online Village*" and is searching for MOOCs and anything that is free (he is unable to pay for online courses from Tunisia) and has ambitions beyond the confines of the classroom: "I want to have my own publications. I want to produce my own books, etc. I'm dreaming. I will never stop dreaming!" Helena and Nora are pursuing a Master's degree in educational technology. Helena won the "Innovative Teacher Award" from Microsoft Tunisia. On the other hand, the fear of losing the skills they have learnt is looming over Maya, who says: "the solution is to practice and practice using the software." When prompted, Ramy admitted that the latest Microsoft training he had attended did not teach him anything he did not know before and complained about the lack of "appropriate opportunities". The question one is tempted to ask IREX and the Ministry of Education and local school staff: "what was the plan for these teachers beyond the TATP?"

6. Conclusion

Despite the study's limitations on triangulation and the inability to observe the teachers, the results can be of great relevance to researchers interested in teacher learning and teacher cognition. A study based on self-reporting data and reflections on experience reveals only one side of the story but can still be informative for teacher educators, policy-makers and international development funding bodies.

The impact of TATP on these teachers is still unfolding. As Robb (2006, p. 343) put it, "The completion of any course or workshop is only a first step towards proficient use of the software, techniques or approaches studied." To apply technology in a low-technology context, they have to be self-reliant and restricted to what is doable under the circumstances. Had it been possible to schedule observation sessions with the participants in this study, more concrete and tangible examples of the teachers' technology use and type of integration would have emerged. While self-reporting provides some indication of their thinking processes, strategies and hopes, it should not be taken to represent actual practice. They did explain that they felt "transformed" as professionals after the TAT experience and gave examples of what they used to do with technology before it but corroboration would have provided firmer evidence of their transition process.

7. Suggestions and Recommendations

Given that the TATP has ended, sustaining the teachers' interest in technology learning and in modeling technology-rich teaching practices is a goal to be pursued by the professional community as a whole. Introducing change involving technology requires collective action and involvement of all stakeholders. Developing a shared vision of the place and status of technology in the teaching and learning process is an essential condition (UNESCO, 2002). The problem of "low resources", when the project is embraced by all, can be addressed collectively as part of the plan. The TAT-trained teachers in the study were left in isolation in the face of the absence of such a technology plan and partners in their institutions. A way forward may be that they consider launching with other teachers a virtual collective learning space with links to web pages, blogs, wiki, or FB pages of individual teachers or classes. The space can be used for sharing ideas in the form of video-taped demonstrations, lectures, software reviews and so on. As technology-capable teachers, they can take on leadership roles, coach and support colleagues and pupils online and, perhaps, hold annual or bi-annual face-to-face events for further bonding and shared learning experiences.

On a final note, I call on the Tunisian authorities and funders of international projects to invest in training teachers in technology integration. The TATP finalists could assist and receive in the meantime further training in tech-supported teaching of specific subjects, material development, and online collaborative mentoring (Doner and Kumar, 2016). Moreover, the Tunisian context being under-researched in the area of technology use in education, there is need for large scale surveys of all stakeholders of the type undertaken by Becker (2001), and action research projects of the longitudinal type based on the TPACK framework (e.g. Tai, 2015; Messina and Tabone, 2012; Chao, 2015; Teo, 2011). Research activity focusing on technology use in the classroom should be embedded in prospective pre-service and in-service programs to help document and disseminate local knowledge about teaching with technology.

Technology is not going to go away, so it would make sense to rally our forces to correct the low-technology situation in our schools. This study can inspire developers of future Ted programs in Tunisia to (re)conceptualise the role(s) of teachers in the 21st-century (Torsani, 2016; OECD, 2010; ISTE, 2008; Hughes, 2004; Egbert Paulus and Nakamichi, 2002).

Appendix 1: A Reconstituted summary of the Tech Age Curriculum (2014 and 2015 sessions)

	Timeline	Focus of the training
Quarterfinal Phase 1 200 teachers	40 hours over 5 weeks (Month 2 & 3)	Computer basics, keyboarding, email, advanced searching online, interpersonal communication using social media, cloud computing, and creating presentations
Semifinal Phase 2 100 teachers	40 hours over 5 weeks (Months 4 & 5)	Creation of visual data, photography, audio, video, games, interactive CDROMs, blogs, web writing (html and CSS), digital story-telling, and online communication tools.

	Timeline	Focus of the training
Final Phase 3 25 teachers	80 hours over 2 weeks (Month 8)	<ul style="list-style-type: none"> - Communication networks and advanced technology skills, - leadership skills, - project writing, - communication skills and persuasion techniques, - Field trips to sites in connection with educational technology, - creating teaching materials

Appendix 2: Questionnaire

University of Manouba
Faculty of Letters, Arts and Humanities, Manouba
Researcher: Faiza Derbel, Assistant Professor of English
2015-2016

Dear colleague

This is a short questionnaire to complete information about your experience as a technology-using teacher in Tunisia. I assure you that all information will be confidential and only used for research purposes. Appreciate your prompt reply.

SECTION 1: Biographical Data

Name: (Will be replaced by a pseudonym)

Last degree (or completed modules):

Age: __ 25-35 __ 36-45 __ 46-56

Number of years of experience:

Current school:

Previous school(s):

Level you currently teach :

What levels of English have you taught so far?

SECTION 2: Educational Experience

Have you ever taken an *Informatics* course at school?

Have you been involved in any training, either privately or provided by the Ministry, in the use of technology for teaching before the TAT experience? ____ Yes ____ No

If yes, provide details about focus and content:

Apart from TAT, what teacher development opportunities did you find available either online or face-to-face after TAT?

SECTION 3: School Situation

Please indicate what facilities and what equipment are made available to you:

SECTION 4: Practice

What technology devices, tools or programs are you able to use under the circumstances above?

Which free software and/or resources do you use regularly with your students? For what activities and how often are you able to do that?

What do you ask the pupils to do out-of-class that involves use of technology and the internet?

What type of guidance do you provide for out-of-class activities? What type of performance do you require?

What type of materials do you download yourself to take to class?

How different are the resources you bring from the ones you ask the students to look up?

What can your personal objectives be for setting targets for your students' performance with technology integration?

What do you do to keep up your technology skills?

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