

Teaching for Tomorrow

21st Century Learning in Action

TfT Final Report: An analysis of
the impact of the project on
teachers' confidence and practice

www.tft-project.eu



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Abstract

The Erasmus+ project, Teaching for Tomorrow (TfT), involved a partnership of educators in five institutions in four countries (Ireland, Sweden, Estonia and Germany). The TfT project aimed to help teachers increase their confidence with and frequency of usage of 21st century teaching and learning (21CL) practices in the classroom. As a part of this project, the primary participants on the project (16 teachers and 5 project leaders), sought to improve both their own skills and practices and to help other teachers develop these practices in their own schools. Through this project, the international partners collaborated to learn from each other and to develop a model of 21CL that could be utilised across subject areas. At the start and end of the project, questionnaires and interviews – designed to identify the 16 participating teachers’ confidence with and frequency of usage of 21CL, as well as their beliefs about the purpose and usefulness of the TfT project itself – were completed. This report presents an analysis of their responses regarding changes in confidence, usage and beliefs of the teachers over the course of the project; in other words, the impact of the project on the primary and secondary participants in the TfT project is presented.

Findings indicate that teachers reported an increase in confidence with integrating various 21CL practices, as well as an increase in their own classroom usage in all areas of 21CL practices, with some aspects being at the statistically significant level. From the data collected, it was also evident that the teachers believed that their participation in the TfT project had a positive impact on their own teaching practice, as well as their schools overall, and greater educational community.



1. Report Context

1.1 Theoretical Framework: 21st Century Teaching and Learning

The perceived importance of a ‘21st Century’ (21C) approach to teaching and learning is well documented (Conneely, Lawlor, & Tangney, 2015; Dede, 2010a; Voogt & Pelgrum, 2005; Voogt & Roblin, 2012). Reasons include a shift in the global economic focus away from traditional goods and services, towards a knowledge-based economy (Claxton, 2013). Dede (2010a) observes that in the modern workforce, 21C skills involving higher-order thinking and communication are increasingly required, not only in the labour force, but also for citizenship and self-actualisation in modern society (Dede, 2010b; Voogt & Pelgrum, 2005).

There is, however, no unique, universally agreed definition of 21C skills. Yet, in their comparative analysis of international frameworks for 21C competences, Voogt and Roblin (2012) note a common recognition of the importance of skills relating to communication, collaboration, problem-solving, creativity, and technological fluency. These are frequently considered higher-order thinking and learning skills, and they are seen as being transversal (not subject-specific) and multi-dimensional, impacting on attitudes and knowledge (Dede, 2010a; Voogt & Roblin, 2012).

In this research, the concept of 21C skills aligns with the work of Ravitz, Hixson, English, and Mergendoller (2012), which emphasises a project-based, collaborative, and student-led pedagogic approach – which is in line with the model being developed by Tft.¹ Ravitz et al. (2012) present a concise and comprehensive definition of 21C skills:

1. **Critical thinking** (CT) – analysis of complex problems, investigation of questions for which there are no clear-cut answers, evaluation of different points of view or sources of information, and use of appropriate evidence to draw conclusions;
2. **Collaboration** (CO) – ability to work together to solve problems or answer questions, working effectively and respectfully in teams to accomplish a common goal, and assuming shared responsibility for the completion of a task;
3. **Communication** (CM) – ability to organise thoughts, data and findings and to share these effectively through a variety of media, including oral presentations and written reports;

¹ For more information, see www.bridge21.ie and tft-project.eu



4. **Creativity & Innovation (CR)** – generation of solutions to complex problems or tasks based on analysis and synthesis of available information, and combination or presentation of the results in new and original ways;
5. **Self-direction (S)** – taking responsibility, both for one’s own learning through the identification of topics to pursue and processes for learning, and for reviewing one’s own work and responding to feedback;
6. **Using technology (T)** – management of learning and creation of products using appropriate information and communication technologies;
7. **Global Connections (G)** – understanding global and geo-political issues including the history, politics, geography, culture, and literature from other countries;
8. **Local Connections (L)** – application of what has been learned, within local contexts and communities.

Though the importance of teaching and creating opportunities for students to develop these skills in schools is generally agreed upon, the process of integrating of 21C teaching and learning practices into the classrooms is complex. It involves changes at system and classroom levels, and the provision of adequate resources.

1.2 TfT Project Overview & Aims

To address these issues, the Teaching for Tomorrow project focused on developing a transnational model of teaching and learning that helps students to develop their 21C skills – to become effective problem-solvers and self-directed learners. The overall objective was twofold: (1) to develop a coherent model for the integration of 21C teaching and learning (21CL) in schools, in order to scaffold the development of students’ basic and transversal skills in an innovative way; and (2) to simultaneously support teachers with the implementation of this model.

This project brought together educators (principals, teachers, researchers, and others) from 4 countries and 5 organisations across Europe, with expertise in various areas, to enhance and refine a model of 21CL (the Bridge21 model¹). The primary participants on the project (16 teachers and 5 project leaders), aimed to improve both their own skills and practices and to help other teachers develop these practices in their own schools.



As part of the project, an initial survey was carried out among teachers across Europe (145 teachers from Estonia, Ireland, Sweden and Germany), which identified the teachers' beliefs about 21CL, as well as their confidence with and frequency with which 21CL practices are used in the classroom. As found and reported in the *Needs Analysis Report* (Bray & Bauer, 2016), teachers in the study had a strong, positive orientation towards the concept of 21CL; for example, the respondents tend to agree that 21CL practices are important and have a positive impact on student motivation. Though they have positive beliefs about 21CL, they had only moderate levels of confidence and lower mean levels of frequency of usage of 21CL teaching practices (using practices on the lower end of a 'monthly' basis). It was clear that confidence in integrating 21CL (e.g. critical thinking, collaboration, communication, creativity and innovation, and self-direction) is positively correlated with regular usage of 21CL practices in the classroom.

To help the researchers and leaders on the TfT project understand the levels of usage of 21CL practices and confidence reported, the survey further aimed to identify the specific barriers to the implementation of 21CL among this cohort of educators. In doing so, the project leaders could shape the direction of the project in order to provide more effective support to the participating teachers. As has been documented in other research, the survey found that common barriers include: system restrictions, such as curriculum and assessment, time constraints, and class sizes; inadequate resources, including continuing professional development (CPD) and communities of practice, as well as physical resources such as technology tools; and aspects of classroom management, such as discipline and management of groups, assessment in the class, and confidence (Euler & Maaß, 2011). Though several barriers were cited, the data further indicated that respondents would welcome an increase in the levels of support for such implementing 21C practices, reflecting an attitude of openness among this cohort.

Accordingly, the TfT project aimed to address some of these barriers – in particular conducting CPD and developing communities of practice to help teachers increase their confidence with and frequency of usage of 21C practices. Over the course of the project, the partners reviewed, modified and adapted an existing, structured framework for 21C teaching and learning – Bridge21 (Lawlor et al., 2018). Developed in Trinity College Dublin, the University of Dublin, the Bridge21 pedagogic model is a team-based, technology-mediated, project-based approach to learning, which is underpinned by a social constructivist ethos (Vygotsky, 1978). It offered a starting point for the development of a



comprehensive, transnational approach for the teaching of basic and transversal skills in secondary schools. It was thought that learning this model through CPD, and with the continued support of both transnational and local communities of practice, teachers could build the knowledge base and confidence to integrate 21CL practices and foster the development of key skills in their students within a traditional school environment.

To support the 16 teachers in the project, the TfT community held five different 5-day Learning, Teaching and Training Workshops, located in the four participating countries, where teachers engaged in intensive CPD sessions. These structured CPD workshops included training in: the Bridge21 model for 21CL learning, innovative constructivist teaching methods and styles, approaches to assessing 21CL skills and practices, and developing communities of practice in one's school. In between sessions, teachers returned to their respective schools, where they shared what was learned with their colleagues – aiming to develop communities of practice (CoP) – and implemented changes in their classrooms. Teachers were further supported through the development of a transnational community of practice. Significant emphasis was placed on the development of both the local and transnational CoPs, given that research has shown that CoPs can motivate teachers to work in more collaborative and innovative ways (Ardichvili, 2008; Kirschner & Lai, 2007). To facilitate the development of the CoP, the TfT project utilised online tools such as Schoology, Facebook, Twitter and a project website to contribute resources and ideas, pose and answer questions, and reflect on experiences. The project website (tft-project.eu) is both a site for participating teachers to share and house the materials they created as a part of the project, but also a site to publicly distribute these resources, such as Bridge21 introductory materials, how-to videos and lesson plans for teachers.

As this project sought to improve teachers' confidence with and frequency of usage of 21CL practices in the classroom – in other words, their readiness to integrate these practices – quantitative and qualitative data were collected throughout the duration of the project in order to assess its impact. After explaining the methods of data collection and analysis, this report examines how the participating teachers' confidence with and frequency of integrating 21CL practices changed over the course of this project.



2. Research Methods

2.1 Questionnaire

At the start of the project, the 16 participating teachers (along with a larger group of their colleagues) completed the questionnaire (Appendix 1) which was used to gather data for the TfT project (Bray & Bauer, 2016) and to establish a baseline of the participating teachers' confidence and frequency of usage. The questionnaire, developed by the partners in Trinity College Dublin, included several items adapted from the 8 subscales of 21CL identified by Ravitz et al. (2012):

- a. Items related to Confidence in 21CL: **Critical thinking (CT)**, **Collaboration (CO)**, **Communication (CM)**, **Creativity & Innovation (CR)**, and **Self-direction (S)**, and
- b. Items related to Frequency of 21CL practices: **Collaboration (CO)**, **Communication (CM)**, **Creativity & Innovation (CR)**, **Using technology (T)**, **Global Connections (G)**, and **Local Connections (L)**.

In addition to the standard survey completed by a larger group of European teachers, the 16 participating teachers answered additional questions regarding their beliefs about the impact and importance of the TfT project itself and the CoP developing through the project.

Each item on the questionnaire utilised a 5-point Likert-type scoring system in order to generate quantitative data. For the items related to confidence (30 items), the scoring ranged from: 1='not at all confident' to 5='very confident.' For the items related to frequency of usage (32 items), the scoring ranged from 1='never' to 5='every day.' For the items related to beliefs about the TfT project (7 items), the scoring ranged from 1='strongly disagree' to 5='strongly agree.'

At the end of the project, the 16 participating teachers completed the same questionnaires once again in order to evaluate any changes in their confidence and usage of 21CL in a numerically quantifiable manner. To analyse the quantitative data and to determine any statistically significant changes in teachers' confidence, practices, and beliefs, statistical software was utilised (SPSS). Paired samples T-test were performed to compare the means ratings across the 16 teachers' responses from the start and end of the project.



2.2 Interviews

To supplement the quantitative data by further illuminating any changes reported and to help determine the impact of the project overall, qualitative data was collected through semi-structured group interviews conducted with the participating teachers at the end of the project. For these interviews, key topics to be covered were decided beforehand, but the sequence and phrasing of questions did vary slightly to allow for a more conversational and informal tone – and for respondents to have the opportunity to fully express their opinions (Cohen et al., 2011). Teachers were grouped by their country and interviewed by one person. 14 of the 16 teachers participated in the interviews. Questions included:

- What was the starting point in your school context and why did you want to be a part of the project?
- How did your intentions/expectations change along the way? How did you refine your plans and approach?
- What challenges did you experience, and how did you overcome them?
- What have you achieved?
- What is the impact of your engagement with TfT? (personal, school, beyond)
- How will you sustain and progress what you have achieved?

These interviews generally lasted 15-20 minutes, and they were video-recorded. TCD partners viewed the video recordings multiple times and transcribed the interviews. Then, qualitative content analysis was performed to analyse and present the data; this is a structured research method, which aims to offer insight and understanding of the phenomenon under investigation through systematically coding and classifying qualitative data in order to identify themes, synthesise information and describe patterns (Hsieh and Shannon, 2005). It is guided by pre-existing theory and relevant research, which are used to develop coding categories to perform the analysis. Through this process, a body of qualitative data can be synthesised into coherent themes and answers to the investigative questions can be formulated.



3. Outcomes and Discussion

In the following sections, findings are presented first by the results from the quantitative data and second by the results of the qualitative data, which further illuminate the results of the numerical data. This section presents findings for the whole group of 16 participating teachers. Statistically significant differences are noted where relevant.

3.1 Teacher Confidence

In terms of their confidence, teachers were asked to respond, on a Likert-scale style, to 30 items related to various 21CL practices: Critical thinking (CT), Collaboration (CO), Communication (CM), Creativity & Innovation (CR), and Self-direction (S). Each item began with the phrase, “How confident are you to let students...” and participants had to select one of the following responses: not at all confident (1), not very confident (2), neutral (3), confident (4) or very confident (5). At the start of the project, the 16 participating teachers’ mean response in each of these 5 categories was moderately positive, ranging from 3.5 to 4.1. Over the course of the project, there was an increase in each of these five categories, and the overall scores ranged from 3.8 to 4.4. The biggest changes, which were also at the statistically significant levels, were in integrating 21CL practices that encourage Self-Direction, Communication and Collaboration among students.

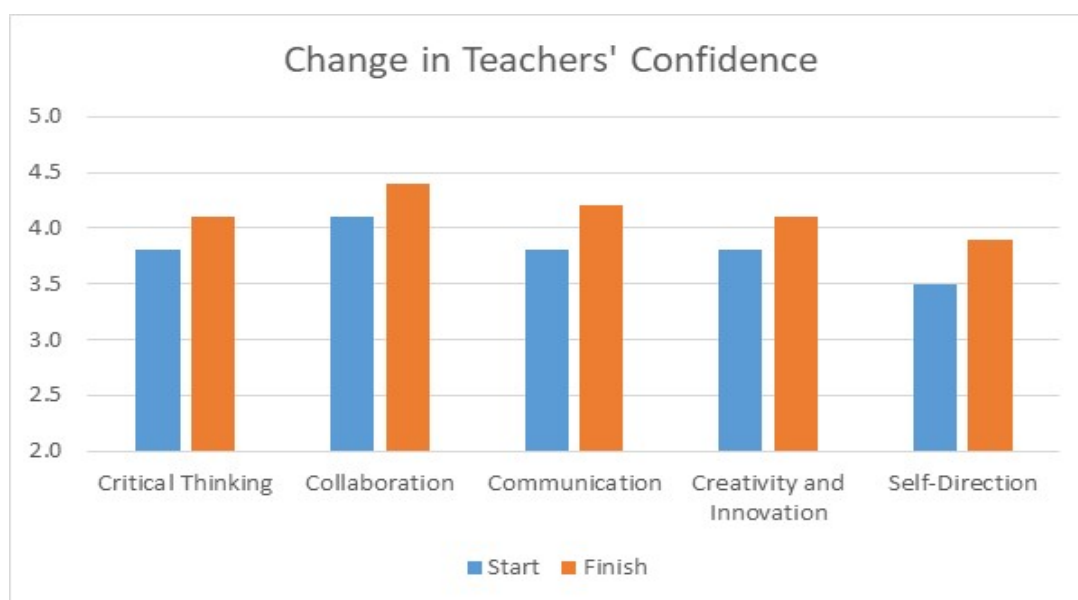


Figure 1: Changes in Teachers' Confidence



The commentary made during the interviews further supported the positive changes seen in the quantitative data, with teachers saying things such as their involvement in the TfT project helped them become “more confident” in the classroom as they improved their “communication and technology skills.” Moreover, they became more self-assured and confident to lead other teachers in their schools and to teach them about integrating 21CL practices. Importantly, their involvement made them feel ready and “open” to using “creative and innovative methods” in the classroom.

3.2 Teacher Practices

With regard to frequency of use, teachers were asked to respond to a Likert-scale style of 32 items in total related to six 21CL practices: Collaboration (CO), Communication (CM), Creativity & Innovation (CR), Using technology (T), Global Connections (G), and Local Connections (L). Each item began with the phrase, “How often do you let students...” and participants had to select one of the following responses: never (1), 2-3 times per year (2), every month (3), every week (4), or everyday (5). At the start of the project, the 16 participating teachers’ usage of these 21CL practices was moderate, ranging from averaging 2-3 times per year to every month (in “point value” that was 2.3-3.1). Over the course of the project, there was an increase of usage of each of these six 21CL, and the overall usage scores ranged from 2.9-3.5, reflecting that these practices were used at least on a monthly basis. The largest increases of usage, which were also at the statistically significant levels, were in integrating 21CL practices that involve using technology and making global connections.

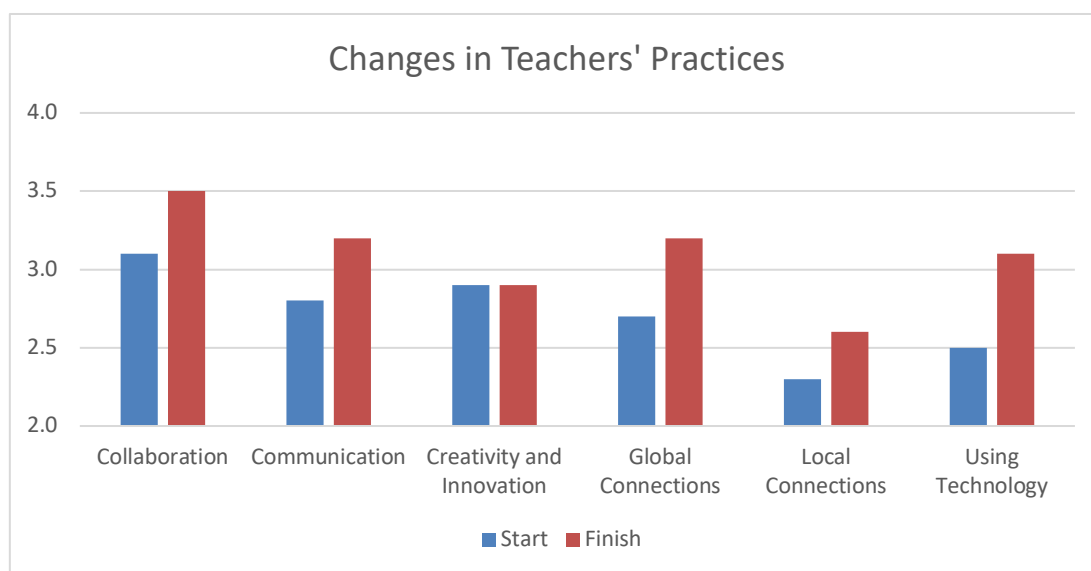


Figure 2: Changes in Teachers' Practices



Throughout the interviews teachers discussed how their work with the TfT project influenced their increased usage of 21CL practices in their teaching, as well as the practices of the other teachers in their schools. They explained that they and the teachers in their school have “changed their teaching style” so that it’s “more student-centred and less-subject centred/teacher-focused.” They believed that they have improved their facilitation of teamwork and collaboration within their classrooms; for several of them, this was a challenge at first because their students were “not used to working in teams” but rather “used to sitting and listening and not doing anything.” Furthermore, some TfT participants have even gone on to collaborate and promote the approach and methods they’ve learned throughout the project with educators in other schools and countries, thus increasing their own 21C skill of making and sustaining global connections.

3.3 Teachers’ Beliefs: Impact of the TfT Project and CoP

Early on in the project, the 16 participating teachers also answered questions regarding their beliefs about the impact and importance of the TfT project itself and the Community of Practice developing through their involvement in it. As with confidence and practices, they completed a questionnaire in which they responded to seven items (see Figure 3) by using a Likert-style scale. For each item, they were asked to “Please indicate how much you disagree or agree with the following statements...” and their options were: strongly disagree (1); disagree (2); undecided (3); agree (4); or strongly agree (5). Toward the beginning of the project, the teachers’ responded that they were mostly unsure about the (potential) benefits and impact of their involvement TfT, with most of their responses reflecting an undecided viewpoint (mean scores for each item ranged from 3.4-4.2). By the end of the project, there was a marked increase in each item, and the mean average score for each item reflected an agree-strongly agree attitude (mean scores for each item ranged from 3.8 – 4.4). The largest increases in terms of agreement, which were also at the statistically significant levels, were in the following items: “Documents, tools, resources, or other artefacts are being created and utilised;” “Knowledge relating to 21st Century practices is shared, and related practice is emerging;” and “Collaborative activities are emerging.”

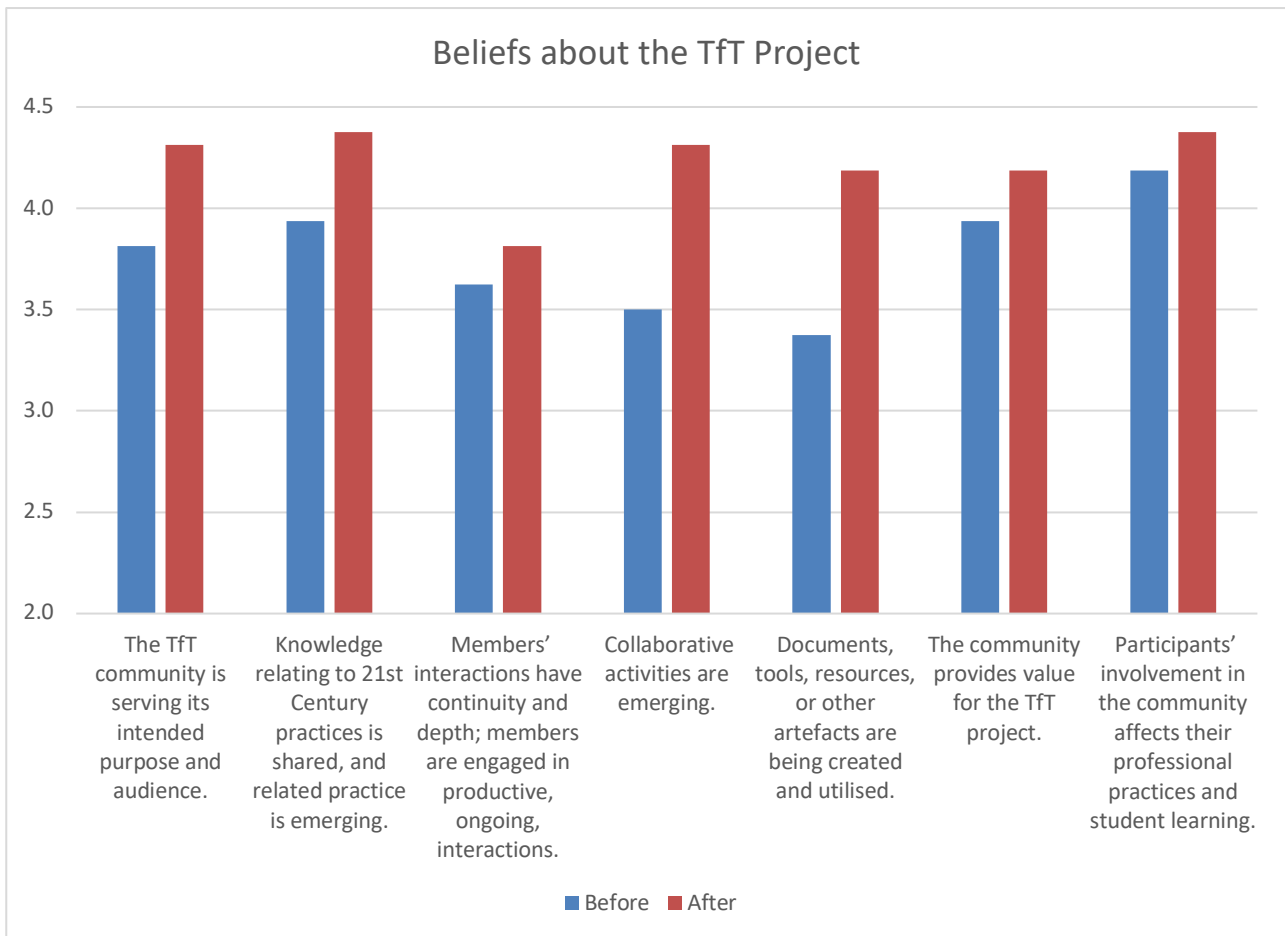


Figure 3: Beliefs about the Impact of the TfT Project

During the interviews, a few teachers verbally summed up this improvement seen in the quantitative data regarding their beliefs about the community of practice, as developed during the course of the TfT project. They reflected that in the future and moving forward, they will continue to “keep contact with partners” explaining that they will “not forget what [they’ve] accomplished together;” furthermore, they expressed that they believe there was value in this “shared experience.” The following section discusses in more detail the impact of the participation in the project on these teachers, their schools and other educators.



4 Discussion and Recommendations

A key aim of the TfT project was to address some of the challenges educators face in integrating 21CL practices; in particular, the project aimed to develop and conduct meaningful CPD and communities of practice to help teachers increase their confidence with and frequency of usage of 21CL practices. From the quantitative and qualitative data collected, it was evident that the 16 teachers believed that their participation in the TfT project had a positive impact on their own teaching practice, as well as their schools overall, and greater educational community. Through the interviews, however, participants also expressed some of the challenges they still face in integrating 21CL practices and made some recommendations for facilitating similar project collaborations in the future.

Impact on Confidence

The teachers reported positive changes in their confidence in integrating and facilitating 21CL practices which encourage the development of key skills among their students. Specifically, the largest gains from the start to end of the project were in their confidence in integrating 21CL practices that encourage Self-Direction, Communication and Collaboration among students. In the interviews, even the most experienced teachers noted that their involvement in the project helped them develop increased confidence in their teaching practice, as they were exposed to many new ideas and inspiration. Their work on the project helped them develop their own skills in areas such as communication and technology, which made them more confident in facilitating these practices in the classroom. Teachers also said that their implementation of new teaching methods changed the relationship between themselves and their students in the classroom, with more of a “partnership” developing. This partnership and newfound confidence gave teachers the courage to engage in learning new materials/methods/tools along with their students and to accept that they might “fail” in the process but would try again until they succeeded.

Though the teachers who directly participated in the project felt that their own confidence improved, they believed it was challenging to encourage the other teachers in their school to feel confident in integrating 21CL practices. They expressed that it was hard to “convince others to leave their comfort zones” and that the teachers in their schools were reticent to try new things. They also said that in several cases, teachers were new to 21CL teaching methods and needed to learn the pedagogical content, as well as how to use the technology themselves. For these reasons they recommend breaking



the learning content and teaching methods into smaller steps, so as not to overwhelm teachers new to the process. They explain that it can be easy to fall back on old teaching practices and recommend more consistent engagement with smaller action items to help build teachers' confidence.

Frequency of Usage

Teachers on the TtT project not only reported an increase in confidence in integrating 21CL practices, but they also reported an increase in their own classroom usage in all areas of 21CL practices – in particular, using technology and making global connections. They rearranged the furniture in their classrooms to encourage more collaboration and communication through teamwork, they positioned their students in more active learning and leadership roles, and they made more meaningful use of technology in their everyday classroom practices. The model of 21CL developed over the course of the TtT project was frequently used by the teachers in their classrooms to help facilitate their 21CL practices. Teachers reported that not only had they personally increased the frequency of their usage of 21CL practices, but also that changes were made at the school-wide level, with the TtT teachers project leading the way. For example, they shared the theory and practical guidelines with their colleagues who, in turn, changed their teaching styles. They aimed to make their schools more student-centred and less teacher-focused. One school, for example, actually used the TtT approach to 21CL to conduct an induction day for their students. They used the learning model throughout the day to complete typical induction day activities: they set-up their school ipads, created online student profiles, investigated and discovered the school history and layout, etc. They believe that introducing students to this model on the first day in their new school helps to establish and underscore the ethos and approach to learning in the school; it reflects the changes that have been made at a school-wide level.

Though there have been positive increases in usage of all the 21CL practices measured, teachers also reported some practical challenges they had in implementing the TtT approach to 21CL. For example, one barrier that they reported at the start of the project and some teachers continued to face was the lack of access to reliable technology tools such as computers/laptops/Wi-Fi. They also found the traditional structure of school day, with typically 45-min slots for lessons, constraining: it was a challenge to implement some 21CL practices, such as students working in teams to complete projects. They suggest that in the future more time be spent on learning how to facilitate this type of learning within 45-min sessions in order to adhere to the time restrictions commonly faced by teachers. In



addition to the time restrictions, they found that it was a challenge to help their students transition from learning in a more traditional style to using the methods of learning in a 21CL approach which require them to take a much more active role in their learning than they are accustomed to. Finally, the teachers had some questions around using this approach with students who have special needs (for example, difficulty working with others in groups) and how to accommodate for those challenges. They believe that in the future, CPD and time spent focusing on how to adjust and implement 21CL practices for various special needs in the classroom would be beneficial.

The Community of Practice

Finally, they reported that the community of practice which they developed with the other European teachers involved in the project had a positive impact on their teaching, as well as personal and professional development. Indeed, the quantitative data revealed development in teachers' beliefs about the efficacy and value of the TfT community of practice. By the end of the project, they reported believing that the TfT community was useful because they were sharing resources and ideas, supporting each other, and communicating and collaborating. They expressed during interviews that they had formed friendly working relationships with other international teachers, learned new ideas and approaches to teaching from their interactions throughout the project, and found each other "inspirational." This community of practice was developed and sustained both in person during the workshops and virtually through the project's various online communication tools and platforms (e.g. E-mail; Schoology, Facebook and Twitter).

The TfT teachers developed communities of practice with not only the other teachers on this project but with the teachers in their schools. From their involvement with the project, teachers reported developing the confidence and skills to establish and lead a CoP in their schools. They believed that the content (21CL approaches and methods) they were learning in TfT brought teachers together to collaborate on developing their practice because it was interesting and useful. The CoP's developed in their school helped to establish a better working environment in which new ideas and lessons were being shared and produced by more educators.

Though the teachers were largely positive about the CoP that emerged through the TfT project, they also shared some challenges of working with an international group of educators and made recommendations for the future. Firstly, the national curriculums of the four countries involved were different. In collaborating, time often needed to be spent to first clarify differences and to determine



which aspects and areas should be of focus for the group. There were also some challenges with language. English was the common language among the group, so all sessions and materials produced during the project were first created in English. Teachers located in non-English speaking countries (Estonia, Sweden, and Germany) had the additional challenge of translating the materials to be able to use with their colleagues and students in their own schools. In future projects, perhaps time could be built in for participating teachers to translate materials during the workshops (the learning, teaching and training sessions), or professional services could be sought.

In terms of their own schools and developing a community of practice, time was a common issue. Most teachers in this project are allocated little time during working hours to collaborate with their colleagues to share and develop practices and ideas. Moreover, the teachers were at times working with colleagues who were reluctant to learn new methods and approaches. Combined with the lack of common planning and sharing time, these factors made it challenging for the TfT participating teachers to share their experiences and learning from the TfT project.

5. Conclusions

In summary, the Teaching for Tomorrow project sought to improve the confidence and frequency of usage of 21CL practices among teachers across Europe through the development and implementation of quality CPD and useful communities of practice. The TfT project, over the course of its 3-year duration, was successful in these aims, with teachers quantitatively and qualitatively reporting significant increases in confidence and frequency of usage. Moreover, these teachers report that they also developed their confidence and ability to disseminate the resources, ideas and methods they learned throughout the project with their respective colleagues in their schools/community. Their engagement with the project had a positive impact on several levels, from the personal to their students to the wider international, educational community.

Teachers also provided useful feedback regarding the challenges they still face in implementing 21CL practices, as well as valuable recommendations for handling these challenges in future projects or among schools and educators. For example, teachers expressed that fitting a team-based, project-based model into short lesson periods is challenging. Because it is unlikely that school timetables will be amended to accommodate 21CL in the near future, it is suggested that projects and teacher



educators spend more time helping teachers learn how to adapt these types of practices and the model for the time restrictions within which they are working. Another challenge faced by the teachers is in educating their colleagues, some of whom may be reluctant to learn or change their methods. The TfT teachers suggested that breaking down the learning process into smaller, more tangible action items can help in transforming teaching practices. Finally, in terms of the language and cultural differences that are involved when bringing groups of people from different countries together in Erasmus+ projects, the TfT teachers suggest that more time be allotted during workshops (learning, teaching & training) weeks to explore, discuss and translate.

Teaching for Tomorrow – and its successes, challenges and recommendations – can, in several ways, serve as a model for other future Erasmus+ KA2 project. The partners on the project effectively collaborated to ensure the teachers were learning and growing in their practice, which will benefit the ultimate target audience: today's students. As teachers learn and develop their own 21CL practices, students will also develop the key 21C skills they need to thrive in today's society and economy.



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Appendix

Part 1: Questionnaire items related to confidence

Participants were asked: “How confident are you to let students...”

- Compare information from different sources before completing a task or assignment?
- Draw their own conclusions based on analysis of numbers, facts or relevant information?
- Summarize or create their own interpretation of what they have read or been taught?
- Analyse competing arguments, perspectives or solutions to a problem?
- Develop a persuasive argument based on supporting evidence or reasoning?
- Try to solve complex problems or answer questions that have no single correct solution or answer?
- Work in pairs or small groups to complete a task together?
- Work with other students to set goals and create a plan for their team?
- Create joint products using contributions from each student?
- Present their group work to the class, teacher or others?
- Work as a team to incorporate feedback on group tasks or products?
- Give feedback to peers or assess other students’ work?
- Structure data for use in written products or oral presentations (e.g., creating charts, tables or graphs)?
- Convey their ideas using media other than a written paper (e.g., posters, video, blogs, etc.)
- Prepare and deliver an oral presentation to the teacher or others?
- Answer questions in front of an audience?
- Decide how they will present their work or demonstrate their learning?
- Use idea creation techniques such as brainstorming or concept mapping?
- Generate their own ideas about how to confront a problem or question?
- Test out different ideas and work to improve them?
- Invent a solution to a complex, open-ended question or problem?
- Create an original product or performance to express their ideas?
- Take initiative when confronted with a difficult problem or question?
- Choose their own topics of learning or questions to pursue?
- Plan the steps they will take to accomplish a complex task?
- Choose for themselves what examples to study or resources to use?
- Monitor their own progress towards completion of a complex task and modify their work accordingly?
- Use specific criteria to assess the quality of their work before it is completed?
- Use peer, teacher or expert feedback to revise their work?

For each question, they chose one of the following responses: *not at all confident; not very confident; neutral; confident; very confident.*



Part 2: Questionnaire items related to frequency of usage

Participants were asked: “How often do you let students...”

- Present their group work to the class, teacher or others?
- Work as a team to incorporate feedback on group tasks or products?
- Give feedback to peers or assess other students' work?
- Structure data for use in written products or oral presentations (e.g., creating graphs, tables or charts)?
- Convey their ideas using media other than a written paper (e.g., posters, video, blogs, etc.)?
- Prepare and deliver an oral presentation to the teacher or others?
- Answer questions in front of an audience?
- Decide how they will present their work or demonstrate their learning?
- Use creation techniques such as brainstorming or concept mapping?
- Generate their own ideas about how to confront a problem or question?
- Test out different ideas or work to improve them?
- Invent a solution to a complex, open-ended question or problem?
- Create an original product or performance to express their ideas?
- Study information about other countries or cultures?
- Use information or ideas that come from people in other countries or cultures?
- Discuss issues related to global interdependency (for example, global environment trends, global market economy)?
- Understand the life experiences of people in cultures besides their own?
- Study the geography of distant countries?
- Reflect on how their own experiences and local issues are connected to global issues?
- Investigate topics or issues that are relevant to their family or community?
- Apply what they are learning to local situations, issues or problems?
- Talk to one or more members of the community about a class project or activity?
- Analyse how different stakeholder groups or community members view an issue?
- Respond to a question or task in a way that weighs the concerns of different community members or groups?
- Use technology or the Internet for self-instruction (e.g., Kahn Academy or other videos, tutorials, self-instructional websites, etc.)?
- Select appropriate technology tools or resources for completing a task?
- Evaluate the credibility and relevance of online resources?
- Use technology to analyse information (e.g., databases, spreadsheets, graphic programs, etc.)?
- Use technology to help them share information (e.g., multimedia presentations using sound or video, presentation software, blogs, podcasts, etc.)?
- Use technology to support team work or collaboration (e.g., shared work spaces, email exchanges, giving and receiving feedback, etc.)?
- Use technology to interact directly with experts or members of local/global communities?
- Use technology to keep track of their work on extended tasks or assignments?



For each question, they chose one of the following responses: Never; 2/3 times per year; every month; every week; or everyday

Part 3: Questionnaire items related to Community of Practice

Participants were asked to: “Please indicate how much you disagree or agree with the following statements”

- The TfT community is serving its intended purpose and audience.
- Knowledge relating to 21st Century practices is shared, and related practice is emerging.
- Members’ interactions have continuity and depth; members are engaged in productive, ongoing, interactions.
- Collaborative activities are emerging.
- Documents, tools, resources, or other artefacts are being created and utilised.
- The community provides value for the TfT project.
- Participants’ involvement in the community affects their professional practices and student learning.