Collaborative and Reflective Environments (CaRE) in Schools

CaRE Needs Analysis: Teachers' collaborative practices and cultural beliefs in the school.

In the initial stages of the CaRE Erasmus+ project, the CaRE partners conducted a survey to establish a baseline of current practice in the partner schools. The intention is to use the results to inform and tailor the project to the needs of the partners, as well as to establish a baseline against which to measure change over time.

The project is a collaboration between six European schools and Trinity College Dublin, the University of Dublin, across five European countries: Austria, Czech Republic, Ireland, Poland, and Spain. The overall aim of the CaRE project is to develop a culture of collaboration and reflection within and between partner institutions. The Trinity Access team designed a questionnaire to help the project leads to understand more about teacher experiences of collaboration, communication, and reflection in their schools. Results indicate that most teachers have a positive outlook towards communication and collaboration of teachers in the workplace. However, there is a relatively low usage of certain collaborative practices, particularly those that involve a more structured approach to team teaching, co-planning, classroom observations and sharing of best practices for continuous professional development.

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Project title: Collaborative and Reflective Environments

Project Information

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CaRE Needs Analysis: Teachers' collaborative and cultural beliefs and practices in the school.

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Executive Summary

Background

Classroom practices today, especially at secondary school level, continue to reinforce the norm of teachers working in an environment of isolation. Teachers tend to work in isolation with their students, and do not regularly engage in collaborative practices with their colleagues. At international level it has been noted for the need to prepare young people for a changing society (Shear, Novais, Means, Gallagher, & Langworthy, 2010) with increased emphasis on the development of students' key skills and competences (Ananiadou & Claro, 2009),

For teachers however there is also a need for '21st Century' methods of teaching and learning that are innovative, competence-based, and student-centred, (Dede, 2010; Joke Voogt, Fisser, Pareja Roblin, Tondeur, & van Braak, 2012; J. Voogt & Pelgrum, 2005). The success of any educational reform depends on the teachers putting it into practice, (Spillane, 1999).

Aims and Purpose of the present study

This study consisted of an analysis of current practices of the primary and secondary target group of the project (teachers and other practitioners in the partner schools) and aimed to establish a baseline against which to measure progress. Data was collected by way of electronic survey, which was distributed to all staff in project schools, using voluntary and snowball sampling techniques. In all partner countries, the analysis was conducted prior to practitioner engagement with the project.

The CaRE Charter (O1) informed the development of the survey, by highlighting areas that are of specific relevance to the project. The scope of the analysis included levels of engagement with CoPs, current practices regarding competence-based and 21C Teaching and Learning, and practices in relation to the development of students' key skills. This was useful to identify the ways in which the target group and institutions could be best supported. Each partner confirmed a minimum of six teachers to be actively involved in the project and the progress of these teams would be tracked, using a variation of this tool, for its duration. The analysis was an important first step towards the other outputs, helping to identify areas of focus and guaranteeing the adequacy of the outputs to correspond to the needs of the target groups. This report was drawn up to illustrate these results and shared with relevant National Agencies to promote their interest in addressing any emerging issues. TCD led the activity as they had ease of access to relevant practitioners and particular expertise in the area.

Methods and Research Design

Preparation of the Baseline Analysis Questionnaire: The Trinity Access team conducted this first activity prior to the initial CaRE partner transnational meeting. The CaRE charter (O1) informed the development of the Baseline Analysis questionnaire and associated research. The research facilitated identification of the most appropriate measures to address project

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needs. The definitive version of the Baseline Analysis Questionnaire was decided upon through collaboration with all project partners. Each of the partners accessed the target group with an online version of the questionnaire. The Baseline Analysis Questionnaire was developed in English, and then translated it into the native languages of the partners from Poland (Polish), Austria (German), Czech Republic (Czech), and Spain (Spanish). Evaluation/Analysis: The Trinity Access team, using quantitative methodologies, collected and analysed the questionnaire data. Interviews were also conducted with the CaRE teachers from each of the project partner schools. This quantitative and qualitative approach highlighted areas in which using the CaRE model could improve the culture and teaching and learning practices in each of the partner contexts. – TCD Dissemination: this report containing the results of the analysis was distributed to the schools in the partner countries so that they could build upon it when developing CaRE activities. The report was also published by the team on the project website (O13) and is available at an international level.

Main Findings

- There is a lack of embedded formal teacher collaborations in teaching and learning practices in schools due to the school timetable. Teachers have little or no time to co-plan, co-teach, or to observe colleagues in the classroom.
- Teachers engage in informal collaborations with other teachers to discuss the sharing of new ideas on effective teaching methods, the quality of students' work products and critically discuss their pedagogical practice at the school/ institution
- Teachers are positive with regards to using technology to facilitate collaboration in the classroom
- Teachers tend not to collaborate with other teachers in external environments outside of their schools when discussing pedagogical practices and effective teaching methods.
- The teachers believe that the overall values of a learning organisation are being achieved in their schools. This includes a high-level of trust between all staff and an agreed sense of purpose, with clear vision/values.
- Teachers are positive towards the use of classroom practices that incorporate the key skills of collaboration, creativity, critical thinking and creativity for better student outcomes.
- Teachers are also positively inclined to include the Bridge21 approach to 21st Century Teaching and Learning (21CL) which focuses on teamwork, project-based learning, student reflection, technology-mediated learning and teachers as facilitators and a focus on the key skills as outlined above.

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Main Report

Since the early 1990s, there has been a continuing focus on developing school systems which enhance student achievement and encourage school leaders to build and sustain capacity for change in their schools (Blankenship & Ruona, 2007). To do this, schools must find ways for teachers to improve effectiveness by establishing ways to collaborate, form relationships and share knowledge (Drago-Severson & Pinto, 2006). To achieve this, two concepts in particular- professional learning communities (PLCs) and communities of practice (CoPs) – have received considerable attention from school leaders, (Blankenship & Ruona, 2007).

School in-house CPD which is inclusive of management and staff has been found to make a positive difference when sharing and developing a vision of learning and creating a culture of improvement in a school, (Co-operation & Development, 2013; Jensen, Sonnemann, Roberts-Hull, & Hunter, 2016). There is, however, evidence to show that teachers can find it hard to integrate collaborative, teacher practices into their schools, often lacking an unclouded vision of what a such an environment might look like. However, even with the traditional barriers such as lack of support from parents and staff, insufficient time, and ingrained school cultures, there still is a strong belief in the concept of a collaborative environment, with leadership frequently noted as an important facilitator of immersive involvement from all parties (Voulalas & Sharpe, 2005).

Survey

Questionnaire Design

To establish the context and background for the CaRE project, the Trinity Access Erasmus+ team designed this questionnaire to establish a baseline understanding of teacher experiences of collaboration, communication, and reflection in their schools. The four sections are as follows:

- Background information
- Community of Practice
- School Culture
- Key Skills

The survey incorporated a five-point Likert-type scales to generate quantitative data for analysis.

- The *Background Information* section generates demographic data relating to school, age, gender, teaching experience, current school experience, classes, and role in school.
- The section on *Community of Practice* comprised of three Likert-type scales, two of which used ‘never’ to ‘almost always.’ The third question related to platforms used by respondents to communicate with each other …
- The section on *School Culture* used a Likert-type scale from ‘strongly agree’ to ‘strongly disagree.’

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- The concluding section representing questions on 'Key Skills' had a scale range from 'almost never' to almost daily'.

This section *Community of Practice* in parts 1 and 2, focuses on teacher collaborations within the school, between colleagues, and external collaborations with other colleagues. A third part question relates to the use online platforms to collaborate with external colleagues. Parts 1 and 2 of this section are based on research adapted from Shear, L., Novais, G., Means, B., Gallagher, L., & Langworthy, M. (2009) and Shear's Innovative Teaching and Learning (ITL) research design (2010). There were eight sub-questions in part 1 and 9 sub-questions in Part 2. This research material was used, as its primary focus is on "innovative teaching practices that provide students with learning experiences that promote 21st-century skills. "Innovative teaching practices," in the ITL model, are characterized by student-centred pedagogy, learning opportunities that transcend the school walls, and the integration of ICT into teaching and learning (Shear, G. Novais, B. Means, L. Gallagher, & M. Langworthy, 2010).

In section 3 *School Culture* the questions focus on how teachers agree or disagree with the ongoing culture within their schools. There are seven sub-questions that are derived from the components identified as necessary for creating a culture supportive of innovation and change in research carried out by Schein, Organizational culture and leadership (2010).

The final section *Key Skills* has two parts, a) current 21st Century (21C) teaching practices in the participant schools and b) the elements of using a Bridge21 (Lawlor, Conneely, & Tangney, 2010) approach to 21C teaching and learning. Each of the categories in part a), Collaboration, Communication, Creativity and Innovation, Managing Myself/Self direction, Managing information and thinking/Critical thinking, Using technology as a tool for learning, each use three sub-questions. These were based on the research of (Bray, Byrne, & O'Kelly, 2020).

Realisation and Sample

Following a meeting of the project administrators from the six participating schools based in Austria, Czech Republic, Ireland, Poland, and Spain, the administrators took responsibility to distribute the questionnaire to teachers in all schools. During these discussions it was especially important that the questions were understood in the same context as they were presented in the online software application (Qualtrics). This face validity with the partners ensured that the questionnaire measured what we had agreed we intended to measure. This was also necessary as the partners needed to check their translations for fidelity with the original meaning. All teacher colleagues were contacted by e-mail and requested to complete the on-line survey created in a software application called Qualtrics. All participation was on a voluntary basis. The remaining sections of the report will look to synthesise and present a meaningful summary of the data collected in the survey. This report will, in association with the research related literature, try to interpret and draw an understanding of survey findings through the discussion and conclusion sections.

The total number of responses from the various countries (211) was inconsistent with the size of their schools (Table 1). A significant variation occurs in gender balance, with 146

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female and only sixty male respondents. Teaching experience is varied, ranging from 1 to 40 years with the highest category of experience between 11-20 years (77), as seen in Table 2. Finally, teachers participating in this survey, teach across different class groups/age groups with 5th year/Grade 11 (ages ~16-17) being the majority group (139). This is followed by 3rd year/Grade 9 (ages ~14-15) with 107 participants and Grade 7 (ages ~12-13) with (102). A smaller proportion of teachers also teach in the (ages ~19-20 group).

Table 1: Geographic breakdown of survey participants

Institution	# respondents	% of teaching staff
St Dominic's Ireland	27	77%
Spain	36	92%
Czech Republic	7	35%
Austria	47	47%
Portlaoise College Ireland	42	66%
Poland	52	57%
Total	211	60%

Table 2: Teaching Experience (Years)

Teaching experience	# respondents
Less than 1 year	13
1 - 3 years	25
4 - 10 years	39
11 - 20 years	77
21 - 30 years	41
31 - 40 years	14
Total	209

Data Analysis

The survey was created and administered using an online software data analysis package (Qualtrics) with further analysis using a second software application (SPSS) for quantitative analysis.

The findings are initially presented showing a general overview of all 211 participants in each of the categories and sub-categories.

Results

Overall Averages

This survey was broken down in to five key sections, exploring:

a) Levels of teacher-led, collaborative, and reflective teaching and learning practices.
b) the school culture and perceived appetite for innovation and change; and
c) the use practices supporting the development of 21C skills in the classroom.

1. The overall findings show that each of the schools have, in the main, a positive orientation to promoting collaborative and 21C practices both in the classroom and the staffroom. However, data analysed from the qualitative teacher interviews

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indicated that due to traditional working practices getting opportunities to work together are limited and not part of the timetable in most of the schools. Of the six CaRE project schools only one school has regular weekly collaborative teacher meetings in the school schedule. As a learning organisation each of the schools again recognise a need to advocate for change and to bring in a culture of innovative approaches as stated below in Table 3 Learning Organisation. However as reflected in the teacher interviews there is not always clear agreement between all staff for a whole school shared vision to develop ongoing teaching practices in all the schools. As one teacher stated, "teachers buy into the vision, I mean you're never going to get all the teachers to buy in to it, but you have to drive on with teachers who do".

Table 3: Mean values per institution given min value of 1 and max value of 5

Institution	Internal CoP	External CoP	Learning Organisation	Key Skills	21C Pedagogies
St Dominic's	3.18	2.5984	4.0238	3.359	3.6246
Spain	3.2143	2.234	3.3254	3.2189	3.6521
Czech Republic	2.7857	2.2321	3.9898	2.8469	3.4048
Austria	2.7731	2.4227	3.8913	3.0118	3.3199
Portlaoise	3.0832	2.6311	3.9023	3.2697	3.6216
Poland	2.8166	2.3608	3.5175	2.7686	3.0902

Community of Practice

A community of practice is a group of people who come together to achieve individual and group goals having a shared common concern or interest in a topic. CoPs often focus on sharing best practices and creating new knowledge to advance a domain of interest or professional practice. (Wenger, 1999).

The *Community of Practice* (CoP) section of the survey includes three scales: In-School CoP, Online/External CoP, and Platform for Online CoP. The first two are adapted from the Innovative Teaching and Learning (ITL) research of Shear and Novais (2009), and use a Likert Scale: 1 - 5: Never, rarely, sometimes, often, always/almost always. The third scale provides a list of commonly used online platforms adapted from Bray, Hannon, and Tangney (2022)

In School Community of Practice

Drawing on the research of Shear et al. (2010), the eight questions illustrated in figure 1 are focused on teachers' use of innovative practices to improve collaboration and reflection within a Community of Practice.

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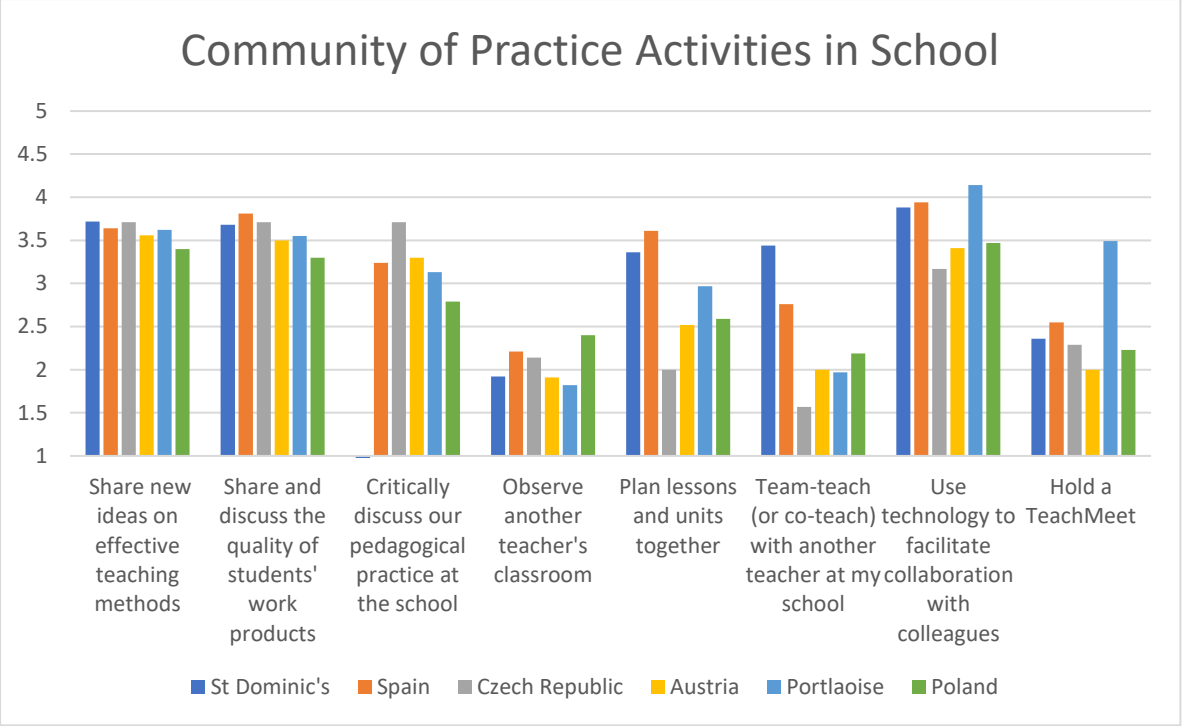

Figure 1: In-school CoP averages

Participants were asked the following questions.

How often do you collaborate with your colleagues within your school/institution in the following ways?

- **Share new ideas on effective teaching methods**

Share new ideas on effective teaching methods		
Mean	N	Std. Deviation
3.58	190	0.736

This result reflects a positive response from teachers to sharing new ideas in most of the institutions, with the average for the whole group of 3.58. This value is relatively consistent for most schools although one school scored (3.17) although not statistically significant. Most teachers responded with Often (39.9%) or Sometimes (33.6%).

- **Share and discuss the quality of students' work products**

Share and discuss the quality of students' work products		
Mean	N	Std. Deviation
3.55	191	0.799

Again, there is an overall positive response to sharing and discussing the quality of students' work with a mean of 3.55. Also 70% of teachers responded with Sometimes (28.3%) or Often (41.7%).

- **Critically discuss our pedagogical practice at the school/ institution**

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Critically discuss our pedagogical practice at the school		
Mean	N	Std. Deviation
3.13	190	0.828

The mean of 3.13 points to fewer opportunities for teachers to critically discuss their pedagogical practice with 67% of respondents answering sometimes (35%) or often (28.7%).

- **Observe another teacher's classroom**

Observe another teacher's classroom		
Mean	N	Std. Deviation
2.06	192	0.884

For all the schools there seem to be few occasions for teachers to observe in another teacher's classroom. Over 24% of teachers answered Never (24.2%) and Rarely 38.6%, with only 23.3% of participant responding Sometimes, Often, or Always/almost always.

- **Plan lessons and units together**

Plan lessons and units together		
Mean	N	Std. Deviation
2.91	193	1.089

The slightly larger standard deviation in responses to this item reflect the variation across the schools, with a mean value of 2.91. While over 60% of participants responded Rarely (23.8%) or Sometimes (26.9%), it appears that co-planning is common in some schools with 21.5% responding Often.

- **Co-teach with another teacher at my school**

Team-teach (or co-teach) with another teacher at my school		
Mean	N	Std. Deviation
2.34	191	1.158

With a low mean value of 2.34 and a high standard deviation, it is apparent that co-teaching is not a widespread practice in most schools. This could be due to several reasons such as willingness on the part of the teachers, space in the school timetable, or inadequate staffing and resourcing. Over 50% of responses feel into the category of Never (25.1%) or Rarely (26%).

- **Use technology to facilitate collaboration**

Use technology to facilitate collaboration with colleagues		
Mean	N	Std. Deviation
3.71	190	0.858

The mean of 3.71 represents the highest mean value for any of the individual items in this sub-scale. The teacher participants are confident in their use of technology and 78% use it in the classroom (Sometimes 25.6%, Often 37.2% and 15.2% Always/almost always).

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- **Hold a Teachmeet (an organised, informal meeting within school, whereby teachers share practice with each other for professional development)**

Hold a TeachMeet (an organised, informal meeting within school, whereby teachers share practice with each other for professional development		
Mean	N	Std. Deviation
2.50	191	1.200

The low mean value of 2.5 reflects that this approach to the sharing of practice is not widespread in the schools. The high standard deviation however shows that there is considerable variance in relation to this item. One of the Irish schools Portlaoise College has embraced the Teachmeet as a method of sharing practice.

Sub-section 2 (External/online)

The questions in this sub-scale were also adapted from the research of Shear et al. (2010), to investigate how teachers collaborate with external colleagues on teaching practices and sharing best practices.

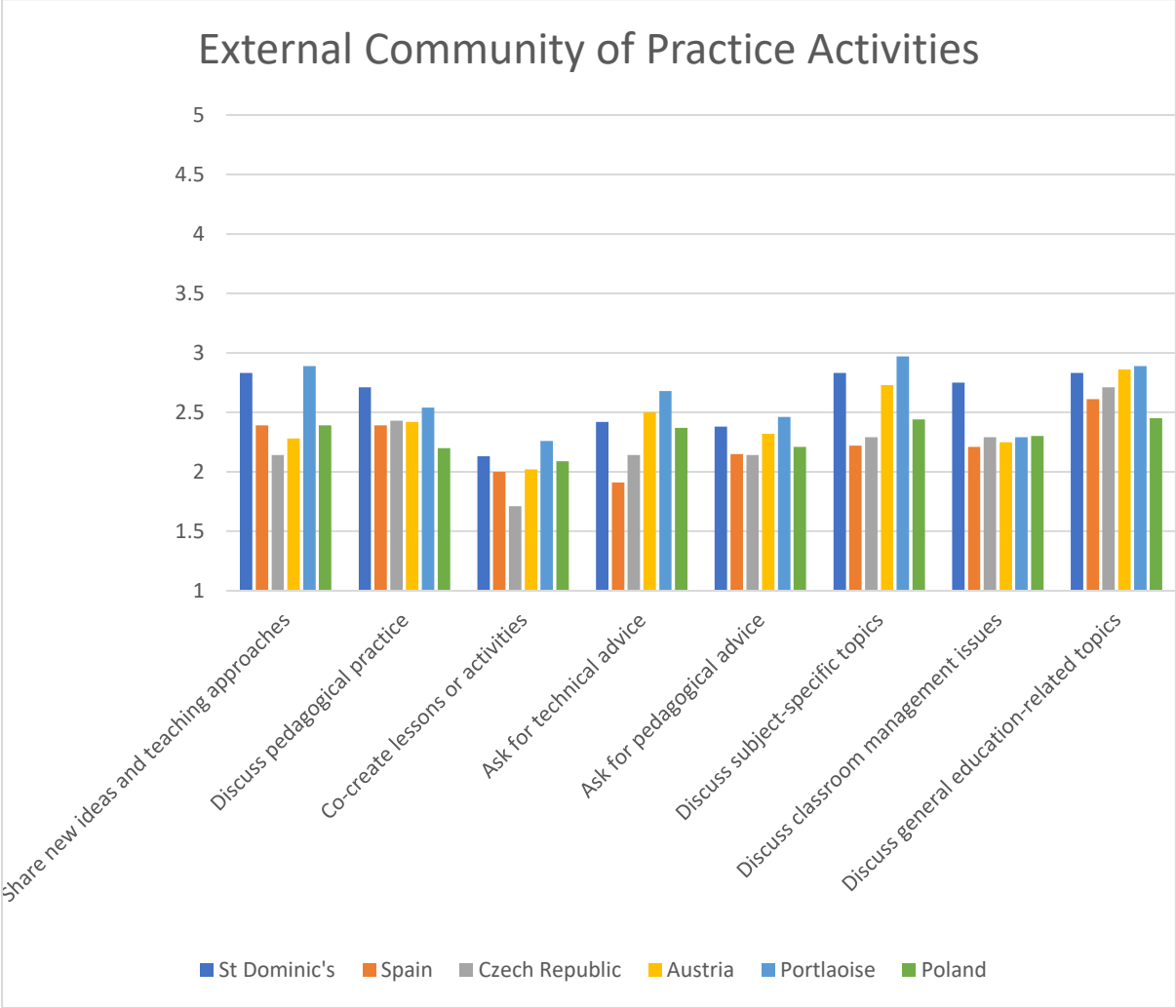

Figure 2 External CoPs averages

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Overall Means CoP External								
	Discuss pedagogical practice	Co-create lessons or activities	Ask for technical advice	Ask for pedagogical advice	Discuss subject-specific topics	Discuss classroom management issues	Discuss general education-related topics	Other (please specify)
Mean	2.43	2.09	2.39	2.29	2.64	2.33	2.73	1.86
N	190	192	191	190	190	192	192	36
Std. Deviation	0.933	0.916	1.004	0.895	1.039	1.009	1.037	1.073

For each item, participants were asked "**How often do you collaborate with external colleagues (educators or education groups from outside your own school) in the following ways?**" As with the previous scale, they were asked to respond using one of the following options: never, rarely, sometimes, often, always/almost always. This is consistent with Shear et al. (2010) and responses reflected the use of innovative practices and collaboration in an external environment. The overall means for external collaborations show low scores when compared with in-school collaborations. There is a distinct lack of regular communication and collaboration between colleagues in an external environment.

The low scores for 'never' and 'rarely' (46.6%) reflect a considerable lack of use for collaboration and communication 'to discuss pedagogical practice' and with only 26.9% answering 'sometimes.' The mean score for 'to discuss pedagogical practice' was 2.43. The responses for 'co-creating lessons' and activities are comparable to 'discussing pedagogical practices' showing that 59.2% of teacher responses 'never' or 'rarely' engage with external colleagues to co-create lessons. The mean score of 2.09 is the lowest for this sub-scale and again reflects a lack of engagement in co-creating lessons or activities. There is a more positive outlook for teachers 'asking for technical advice' from external colleagues with a total of 46.2% of respondents responding with either 'sometimes' or 'often.' There is a greater need for teachers to seek out technical help when in engaging in more technologically based classroom activities.

The mean responses for 'discuss subject-specific topics' do not show improvement and are lower than for pedagogical practices. Pedagogical practices (59.6%, 'rarely,' 'sometimes') and subject-specific topics (52.9%, 'rarely', 'sometimes'). For 'discussing classroom management' with external colleagues, the mean score was 2.33. This compares to the other questions, with teacher responses of 20.2% for 'never' reflective of low levels of external collaboration and not statistically significant. The responses for 'rarely' and 'sometimes' totalled 54.7% was in-line with most of the questions asked in this sub-scale. Again, the responses to 'discuss general education related topics' is in line with engaging in collaborative practices with colleagues external to the school. The mean value of 2.72 is however the highest scoring item in this scale.

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Sub-section 3 (Platforms)

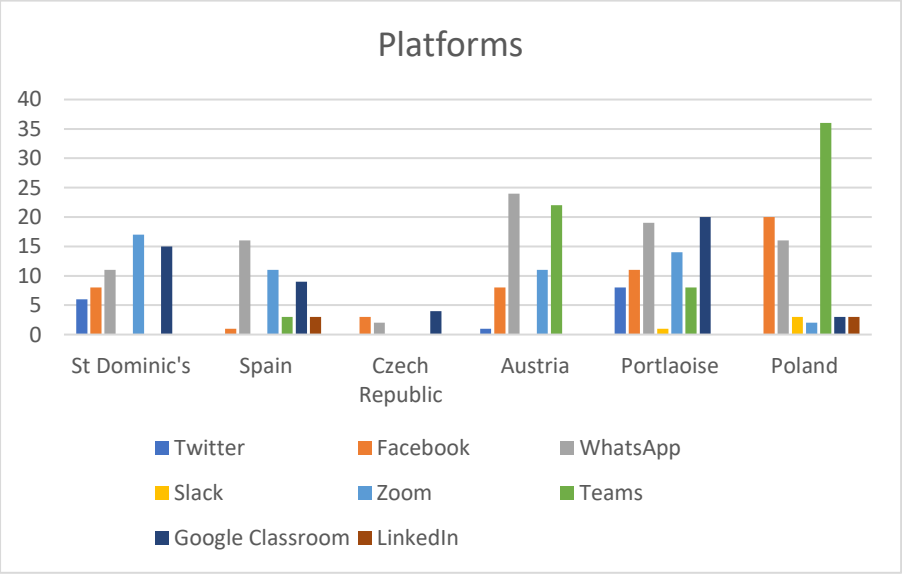
In this question participants were asked 'What online platforms do you use to communicate or collaborate professionally with your external colleagues'?

Table 4:platforms for External communication

Institution	Twitter	Facebook	WhatsApp	Slack	Zoom	Teams	Google Classroom	LinkedIn
St Dominic's	6	8	11	0	17	0	15	0
Spain	0	1	16	0	11	3	9	3
Czech Republic	0	3	2	0	0	0	4	0
Austria	1	8	24	0	11	22	0	0
Portlaoise	8	11	19	1	14	8	20	0
Poland	0	20	16	3	2	36	3	3

The schools varied in their use of the platforms to communicate with external colleagues with WhatsApp scoring the highest with eighty-six teachers using the social media mobile application followed by Microsoft Teams (66) and the video chat Zoom application (55). The use of WhatsApp would highlight a more informal approach by teachers to communicate with external teachers as it is predominantly a mobile application whereas MS Teams and Zoom would indicate a more formal approach and require specific planning to engage in online activities.

Figure 3: Platforms used by schools



The embedded use of a platform in a school communication system shows higher engagement with the platform in particular the teachers of the Austrian and Polish schools who are regular users of MS Teams in their normal working environment.

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Learning Organisation

A learning organisation (LO) as stated by Senge (2006) is a group of people working together collectively to enhance their capacities to create results they really care about. He defines the five characteristics of an LO as follows:

•**System thinking** the capacity for putting all the pieces together and seeing them as a whole
Personal mastery: the capacity to clarify what is most important to us within an organisation
•**Mental models**: the capacity to reflect on internal pictures of the world to understand how they shape our actions
•**Shared vision**: the sense of commitment within a group, based on what people would really like to create or develop
•**Team learning:** the capacity for conversation.

Table 5: Learning Organisations Mean Averages

Institution	There is a high level of trust between all staff	There is an agreed sense of purpose, with clear vision/values	There is an openness to innovation and risk, characterised by resilience and an ability to bounce back from set-backs	There is a general readiness for change in the staff	There is a sense of collaboration, collegiality, and interdependence	The leadership is shared and enabled across the school	There is celebration of learning at all levels of the school community (staff and students)
St Dominic's	4.21	4.08	4.12	3.54	4.21	4	4
Spain	3.21	3.58	3.56	3.16	3.52	2.88	3.39
Czech Republic	4	4.33	3.83	3.57	4.29	4	3.5
Austria	4.16	4.02	4.02	3.42	4.3	3.86	3.45
Portlaoise	3.89	3.92	3.87	3.76	4.05	3.84	3.97
Poland	3.49	3.7	3.61	3.23	3.61	3.27	3.59
Total Mean	**3.78**	**3.86**	**3.83**	**3.42**	**3.94**	**3.56**	**3.65**

The *Learning Organisation* section of the survey is adapted from research of Schein (2010) using a Likert Scale: 1 - 5: Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree.

For each item, participants were asked **"Please indicate your level of agreement with each of the following statements in relation to your school or institution?"**

There is a high level of trust between all staff
There is an agreed sense of purpose, with clear vision/values
There is an openness to innovation and risk, characterised by resilience and an ability to bounce back from setbacks
There is a general readiness for change in the staff
There is a sense of collaboration, collegiality, and interdependence
The leadership is shared and enabled across the school
There is celebration of learning at all levels of the school community (staff and students).

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The participants from each school for 'high level of trust' answered in a positive way with St. Dominics recording the highest mean (4.21) and the Spanish school the lowest (3.21) with a standard deviation of 1.081. The difference of means between the Austrian school and the Spanish school is significant (0.02). Each of the schools for 'an agreed sense of purpose' also answered in a positive way with a mean of 3.86. The Czech Republic school had the highest mean (4.33) and the Spanish school the lowest (3.58) with a standard deviation of 1.014.

For 'openness to innovation and risk' the total mean was (3.83) with a standard deviation of 1.009. St. Dominics scored the highest mean (4.12) and the Spanish school the lowest score of (3.56). The next question 'a general readiness for change' had the lowest mean score (3.42) and standard deviation of (.988) from the seven questions and indicated the possibility that schools may want change but were not always ready for it. The Spanish school scored the lowest (3.16) followed by the Polish school (3.23) with the highest score from Portlaoise College (3.76).

For the next question 'sense of collaboration' it reported the highest mean of (3.94) with a standard deviation of (0.905). The school with the highest score was the Czech Republic followed closely by St. Dominics (4.21) and the lowest score by the Spanish school (3.52). Again, the difference of means between the Austrian school and the Spanish school is significant (0.02).

The 'leadership is shared' question had the second lowest mean (3.56) and the highest standard deviation of 1.138. Two schools St' Dominics and the Czech School scored the highest joint mean score of (4.00) and the lowest scoring mean was the Spanish school (3.39).

The final question 'celebration of learning' had a mean score of (3.65) with a standard deviation of 1.094. St. Dominics again scored the highest mean (4.00), and the lowest mean score was from the Spanish school (3.39).

Key Skills

Figure 4: Mean Averages Key Skills in the Classroom

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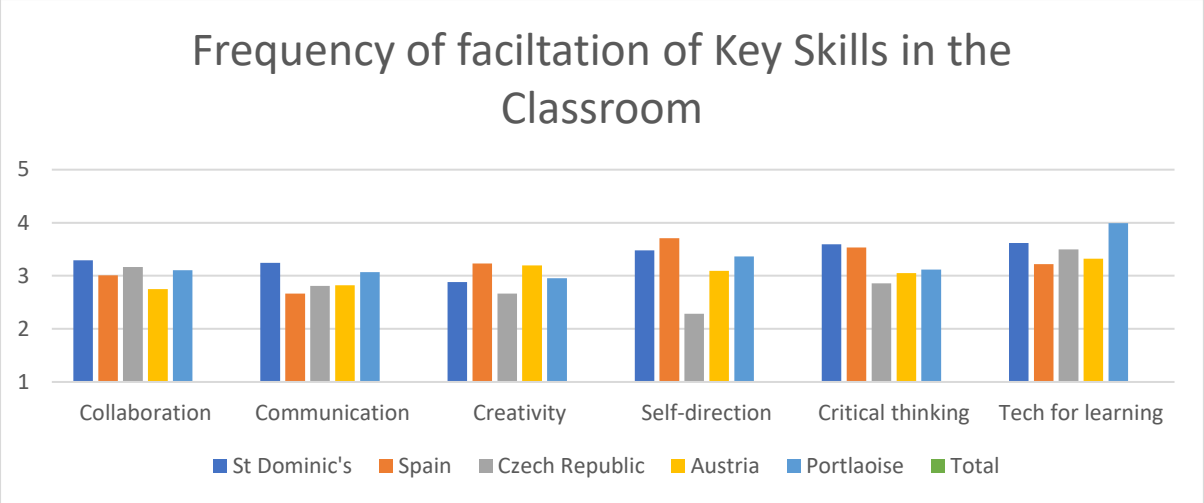

This sub-section is adapted from an on-line student survey, A Short Instrument for Measuring Students' Confidence with 'Key Skills' (SICKS): Development, Validation and Initial Results, validated in Bray, A., Byrne, P., & O'Kelly, M (2020). It is based on research by Ravitz (2014) and Hixon et al. (2012).

The questions looked at current 21st century (21C) teaching practices using six key elements: collaboration, communication, creativity and innovation, managing myself/self-direction, managing information and thinking/critical thinking, and using technology as a tool for learning. These elements were further broken down into three questions relating to each element.

Table 6: Mean averages for each Key Skill

Institution	Collaboration		Communication		Creativity		Self-direction		Critical thinking		Tech for	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
St Dominic's	3.29	1.07	3.25	1.28	2.88	1.28	3.48	1.08	3.59	1.19	3.62	1.16
Spain	3.01	1.45	2.67	1.39	3.23	1.45	3.71	1.32	3.53	1.40	3.22	1.54
Czech Republic	3.17	0.80	2.81	0.80	2.67	0.90	2.29	0.78	2.86	1.51	3.50	1.12
Austria	2.75	1.13	2.82	1.13	3.20	1.30	3.09	1.27	3.05	1.31	3.32	1.23
Portlaoise	3.11	1.15	3.07	1.15	2.96	1.16	3.36	1.13	3.12	1.13	3.99	1.24
Poland	2.89	1.14	2.48	1.14	2.67	1.18	2.72	1.17	2.70	1.28	3.20	1.27
Total	3.04	1.12	2.85	1.15	2.93	1.21	3.11	1.12	3.14	1.30	3.48	1.26

Collaboration (CO) - How often do you ask students to

- Work in pairs or small groups to complete a task together
- Work with other students to set goals and create a plan for your team
- Create joint products using contributions from each student

For 'Collaboration' there was a total mean value (3.04) for the three questions and standard deviation of (1.201). The mean score for question 1 (3.71) differed from

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questions 2 (2.56) and 3 (2.63). This reflected a positive approach to have students work in pairs or small groups to complete a task together.

Communication (CM) - How often do you ask students to

- Communicate their ideas using media other than a written paper (e.g., posters, video, blogs.)
- Prepare and deliver an oral presentation to the teacher or others
- Answer questions in front of an audience

The second item 'Communication' had a mean score (2.82) and standard deviation of (1.245). the second question preparing and delivering an oral presentation to the teacher or others scored a lower mean (2.40) when compared to questions 1 (2.93) and 3 (3.12).

Creativity and Innovation (CR) - How often do you ask students to

- Test out different ideas and work to improve them
- Invent a solution to difficult problems
- Create something new that can help them express their ideas

'Creativity' had a mean score of (2.95) with a standard deviation (1.260). The three questions, individually, had means of question 1 (3.10), question 2 (3.02) and the lowest for question 3 (2.73), 'creating something new that can help them express their ideas'.

Managing myself/Self-direction (MM) - How often do you ask students to

- Track their own progress and change things if they are not working the way that they should be to complete a task
- Assess the quality of their work before it is completed
- Use peer, teacher, or expert feedback to change your work

The second highest scoring mean (3.18) was for 'managing myself'. and showed a positive response to assessing the quality of their work before it is completed. The standard deviation was (1.264).

Managing information and thinking/Critical thinking (CT) - How often do you ask students to

- Try to solve problems or answer questions that have no single correct solution or answer

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- Draw their own ideas based on analysis of numbers, facts, or relevant information
- Analyse different arguments, perspectives, or solutions to a problem

The 'managing information' item scored an overall mean of (3.13) with a standard deviation (1.309). Again, there was a consistency for all three questions with means of question 1 (3.19), question 3 (3.30) and the lowest score question 2 (2.90) drawing their own ideas based on analysis of numbers, facts, or relevant information.

Using technology as a tool for learning (T) - How often do you ask students to

- Use technology to work in a team (e.g., shared workspaces, email exchanges, giving and receiving feedback.)
- Use technology to keep track of your work on assignments
- Use technology to help to share information (e.g., multi-media presentations using sound or video, presentation software, blogs, podcasts.)

The highest scoring mean was for 'using technology' (3.45) with standard deviation of (1.309). This highlights a positive use of using technology as a tool for learning.

Elements of B21 approach

Table 7: Mean averages for elements of B21 approach

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Institution	Teamwork	Technology-mediated learning	Project-based learning	Teacher as facilitator	Student reflection	Focus on Key Skills
St Dominic's	4.00	3.64	2.87	3.74	3.50	3.91
Spain	3.63	3.87	2.50	4.19	3.81	3.87
Czech Republic	4.14	3.71	2.71	3.14	2.86	3.86
Austria	4.08	3.87	2.36	3.50	2.35	3.85
Portlaoise	3.62	4.03	2.92	3.92	3.35	3.92
Poland	3.56	3.64	2.25	2.97	2.73	3.31
Total	3.84	3.79	2.60	3.58	3.10	3.79

The sub-section 'elements of a B21 approach' is based on the research reported in Trinity Access - Project Overview, Tangney B et al. (2021). The questions were adapted to reflect the Bridge21 approach to 21C Teaching and Learning using a 5-point Likert Scale: 1 - 5: Never/almost never, once or twice a term, once or twice a month, once or twice a week, daily/almost daily. The participants were asked to respond to 'For each of the following, please identify the extent to which you use it in your teaching' for the seven 21C skills: Teamwork, Technology mediated learning, Project based learning, Teacher as facilitator or mentor, Peer feedback or individual student reflection and Focus on key skills development.

The mean score (3.84) with a standard deviation (1.103) for 'Teamwork' is positive, indicating that most respondents were likely to use teamwork in the classroom on a regular basis. The Czech School scored the highest mean (4.14) and the Polish school with the lowest (3.56). Overall (50.7%) of participants responded that they use teamwork 'once or twice a week' or 'daily/almost daily' in the classroom. For 'Technology mediated learning' the mean (3.79) with a standard deviation (1.138) was also positive and reflected the extent of the use of technology in the classroom by the participants. A total of (66.9%) teachers responded, 'one or twice a month, once or twice a week' or 'daily/almost daily.' The mean (2.55) for 'Project-based learning' was the lowest of the six skills with a standard deviation (1.137). The highest scores recorded were from the 2 Irish schools Portlaoise College (2.92) and St. Dominics (2.87) and the lowest from the Polish school (2.25). In total (45.8%) of participants responded 'never/almost never, once or twice a term). The 'teacher as facilitator or mentor' had a mean of (3.58) with a standard deviation (1.300). The Spanish school had the highest scoring mean (4.19) and the lowest mean recorded was from the Polish school (2.97). Overall (44.4%) of respondents answered, 'once or twice a week' or 'daily/almost daily.' The second lowest mean (3.10) recorded was for 'peer feedback or individual student reflection' with a standard deviation (1.211). The Spanish school scored the highest mean (3.81) followed by St. Dominics (3.50) with the lowest scoring mean from the Austrian school (2.35). The final skills element 'Focus on Key Skills' showed consistent responses from five of the six schools to the mean (3.79) with only the Polish school (3.31) differing from the other schools.

Discussion

The aims of this research survey were to identify current beliefs and practices of teachers in respect to the role and use of Communities of Practice activities both in their school and externally with other teachers. The research also focused on how teachers perceived their

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schools as a working environment to create and maintain a culture for innovation and change. The last part of the survey concentrated on current 21C teaching practices and how teachers used them in the classroom.

The first survey section 'Communities of Practice' is divided into two sub-sections and looks at teacher practices from an internal CoP in the school perspective and from an external CoP perspective outside of the school. For the internal CoP there is, in general, a positive outlook from teachers when engaging in collaborative practices but putting it into practice, however, as Ainley & Carstens (2018) report in the Teaching and Learning international survey (TALIS), only 1 in 5 teachers feel they work in a professional collaborative culture, with only 28% involved in team classes once a month In this research by means of the qualitative interviews with the CaRE teachers and this survey, collaboration happens in more informal settings for the sharing of practices than in more formal collaborative activities both in and out of the classroom. A teacher commenting on an informal conversation with a colleague about a student noted "and I know the teacher very well for ten years, but I would never discuss teaching methodologies with him" and "there is opportunities just maybe I would be at the stage in my career where I don't avail of the opportunities maybe that other teachers might".

This is highlighted in the breakdown of mean values for each of the eight questions where teachers do not have collaborative activities as part of their teaching timetable. The four practices most used are 'use technology to facilitate collaboration' (mean 3.71), 'share new ideas on effective teaching methods.', (mean 3.58), 'share and discuss the quality of students' work products' (mean 3.55), and 'critically discuss our pedagogical practice at the school/ institution' (mean 3.13). The four practices that are least commonly used are 'co-teaching' (2.34), 'plan lessons together' (2.91), 'observe another teacher's classroom' (mean 2.06) and 'hold a Teachmeet' (mean 2.50).

From this result and as reported by teachers in the teacher interviews, in most schools there is little opportunity for teachers to formally collaborate. As stated by a CaRE teacher "someone goes to a conference somewhere and then shares with a group of colleagues what the person has learned but no nothing formal." Through this work, we aim to give people an opportunity to, if they see the value in it, try out and develop these practices in their schools. Each of the schools for Internal CoP scored means which showed minor variation between them, however the highest mean scored (3.21) from the Spanish school identified a more planned approach to formal teacher collaboration. In the Spanish school teachers can meet for collaborative practices and this is timetabled by the management in the overall school timetable. This is a good reason for why these are the practices upon which our project will focus.

In the external CoP environment, there is even less engagement by teachers to collaborate and share practices. The overall means for each of the sub-questions ranged from a low of 2.09 for 'co-creating lessons' to a high of 2.73 'discuss general education related topics'. This again indicates that even with online technologies available there is a lack of a formalised approached to collaborative practices online. This also shows that teachers, when communicating and collaborating online, tend to focus on general topics of education rather than more formal engagements of 'co-planning,' discussing classroom management issues

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and ‘asking for pedagogical advice.’ It is interesting that even with a greater emphasis on online use in schools during the recent Covid period the use of external online teacher collaborations has not embraced as a positive way for teachers to share their practices.

The second section ‘Learning Organisation’ showed an overall positive outlook, and the high mean score for each sub-section illustrates that the teachers responding to the survey were largely satisfied with the overall management of the school and collaborating with their colleagues. This indicates that for teachers in each of the schools there is a focus on promoting a culture for innovation and change however this is still not on a level for whole school involvement.

There were, however, significant country differences between schools. The Spanish school showed significantly lower differences for ‘high level of trust’ than St. Dominics, (0.008) and significantly lower levels of ‘high level of trust’ than the Austrian school (0.002).

This could relate to cultural approaches in each of the countries and how teachers in the Spanish school can have different views of staff inclusion. Teachers still tend to work as individuals and not see the potential for those teachers who do collaborate during planned teacher meetings. As a CaRE teacher commented “it depends on the people here, there are some people who, I don't know how to say, who is carrying the others” (sic).

A second significant difference between the Spanish school and St. Dominics for ‘leadership is shared’ again would highlight that not all teachers take part or are aware of decision-making processes within their school. The Polish school for ‘collaboration, collegiality, and interdependence’ also showed a significant difference when compared to the Austrian school. Again, this shows possible cultural differences between the schools as the Polish school has fewer collaborative interactions between their teachers. As stated by a CaRE Polish teacher, “the school day starts at 08:00 and finishes at 21:00, there are less opportunities for informal contact in the school, and for teachers to share practices”.

The third and concluding section ‘21C Key Skills’ firstly highlights that teachers across Europe are positive on the use of 21C skills and the concepts of 21C when engaging with their students. This section of the survey has two sections, ‘current 21C teaching practices and ‘elements of the Bridge21 approach’. For sub-section 1, teachers understand that working with these skills, Collaboration, Communication, Creativity, Managing myself/self-direction, Managing information and thinking/critical thinking, and Using technology as a tool for learning, by students, is beneficial to greater positive student learning outcomes. Whilst teachers share these beliefs there are significant ongoing barriers that prevent the use of these practices in the classroom. In line with previous research (Ainley & Carstens, 2018; Caena & Punie, 2019) teachers continue to be challenged implementing these practices into daily use with the biggest barriers being: exams/assessments, short class periods, curriculum overload, and the availability of technology and other resources. In short, the biggest challenges for teachers are system restrictions. To achieve greater persistence in the use of these key skills there must be changes made at a systemic level which include longer classrooms for project work, adjustments to the curriculum content

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and more investment in technology and other resources that can be used to foster greater collaboration, communication, critical thinking and creativity, activities for students.

Each of the sub-sections identify an understanding for teachers to implement key skills in the classroom but the processes required to implement them continue to challenge the means to ensure greater focus on these key skills to enhance greater positive student outcomes.

Conclusions and Recommendations

This survey reports on European teachers and their beliefs and practices in relation to the use of Communities of Practice for teacher collaboration, the structure of their schools for creating a culture for innovation and the implementation of more innovative 21C practices in the classroom. Educators working in teacher professional development (TPD), will find this information useful and this section aims to provide recommendations for focusing and structuring opportunities in these related areas.

There is a clear understanding that teachers are interested in collaborative processes and the use of communities of practice to share and develop better teaching practices to enhance more positive student learning outcomes. The data analysed reflected more informal approaches to the sharing of teaching and learning practices. The results show that most teachers are open to collaborations about the sharing of innovative ideas on effective teaching methods, the quality of students' work and critically discuss pedagogical practice at the school. However, for more structured approaches there continues to be system restrictions that fail to incorporate the use of a more formal processes in the school timetables. Most schools do not make use of the teaching timetable to encourage teacher collaborative practices and teachers continue to work in isolation. As noted in the TALIS 2013 conceptual framework (Rutkowski et al., 2013) research has repeatedly found collaboration among teachers to be a particularly important professional practice because it appears to play a role in various elements of teachers' work, including teaching practice, learning, decision making, and satisfaction, as well as in school culture, (Desimone, 2009; Goddard, Goddard, Sook Kim, & Miller, 2015).

To ensure a more systematic approach there must be more of an emphasis on developing key strategies to encourage and support continuous teacher collaboration. Results of analysis of this survey identified has identified areas that are currently lacking in schools and this project aims to explore how these activities can be effectively established as more frequent classroom practices. These elements including co-planning of lessons, teacher classroom observations, co-teaching and the use of TeachMeets, which are all focused on the formal sharing of best practices within the schools' environment. In defining effective

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professional development, Darling-Hammond, Hyler, and Gardner (2017) describe it as structured professional learning resulting in changes and improvements to teacher practices and student learning outcomes. Darling-Hammond, Wei, Andree, Richardson, & Orphanos (2009) showed that student achievement gains are related to sustained and intensive CPD using collaborative approaches that promote school change and extends beyond individual classrooms.

Schools continue to engage more with the use of technology. However, the results of this analysis suggest that the use of technology to facilitate collaboration between teachers is still not part of regular processes. One of the CaRE project goals is to create guidelines to increase online collaboration between teachers, by establishing online communities of practice to promote active inter-school engagement. For these to be effective they must, encourage self and collective reflection, change the role of teachers to co-learners and reduce teacher isolation (Lai, Pratt, Anderson, & Stigter, 2006). It is important that those administrators, in positions to make systematic changes, should do so, but it is also incumbent on teacher educators to promote teaching approaches that can fit into current school timetables, including the extending of lesson plans over multiple classroom sessions for greater focus on project-based, innovative collaborative approaches when engaging with students.

Schools continue to evolve and, in the context of this project, one of the ultimate goals of any school should be to create a culture for innovation and change. To achieve whole school buy-in, it is generally positive to have support from management, with school leaders in a good position to promote a schoolwide emphasis on innovation and change. However, schools do not always have sufficient management support, and part of this project is to encourage a" grassroots" approach by getting teachers to engage in communities of practice that will eventually become more widespread within the school community. Teachers need to focus on their own voice and be prepared to initiate more collaborate and reflective practices through greater sharing of knowledge and innovative teaching and learning practices.
Results of analysis of the survey showed that whilst most teachers agree that their schools promote an agreed sense of purpose and openness to innovation. However, this would not be the case for all the teaching staff. Contemporary teachers continue to be leaders in these areas but there are also a cohort of teachers grounded in more traditional values in relation to teaching and learning. As commented by a teacher participant "teacher collaboration I would say is quite good in a sense that I suppose it would be closer maybe to the teachers who started than when I started and there's a bit of divide, I'd be one of the older teachers in the school". The focus of the project is developing, within each school, a community of practice that will overtime extend its membership be inclusive of all teachers, encouraging those with a more traditional outlook to embrace some of the progressive and innovate approaches to teaching and learning

The results of this survey, it must be acknowledged, have their limitations in representing the beliefs, practices, and subsequent needs of secondary teachers in Europe. The sample

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presented in this research is made up only by teachers s from the six project partner schools in five countries, - Ireland, Spain, Czech Republic, Poland and Austria. Also, there are imbalances between the numbers of teachers from each country, for example seven teachers (35% of teaching of staff) from the Czech Republic compared with thirty-six teachers (92% of teaching staff) from Spain and highlights quite different teaching staff numbers and representation thereof, for each of the schools. Also, teachers who did choose to participate in this volunteer study may be more likely to have a positive disposition toward the concept of developing learning organisations and improving 21st Century (21CL) teaching and learning practices. These participants included the teachers involved in the Erasmus+ CaRE project and teachers from their schools. This favourable attitude would potentially be different to an average group of European secondary school teachers.

Although there are limitations to this study, the authors of this report believe that the results clearly indicate areas in which teachers need support, and that it provides useful information to teacher educators who are interested in communities of practice, learning organisations, 21CL and related areas. While changes need to be made at the systemic/policy-making level, important work can still happen in a positive and collaborative way to encourage and support these changes as we move forward.

In summary the following outlines the authors' recommendations:

- Develop a learning organisation, starting with a core school Charter, that clearly identifies an agreed sense of purpose, with clear visions, values and whole school aspirations which is welcomed by management and all staff.
- Focus on Communities of Practice: Teachers can empower themselves with support from management to develop collaborate practices in school including co-teaching, classroom observation, TeachMeets and co-planning.
- For school management and associated government policy makers to focus on allocating time within the school timetable for teachers to engage with other teachers and incorporate collaboration practices in everyday teaching.
- Teachers need to develop their own voice and reach out to fellow teachers to increase innovative teaching and learning practices with greater sharing of knowledge.

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Appendix

CaRE code book

Section	Topic	Question	Scale & Scoring	Sub-questions	Citation	Notes
Consent	Consent	Do you consent to participation	y/n			
Background Information	School	What is the name of your school	MC	Trinity College Dublin; Bundesgymnasium und Bundesrealgymnasium Schwechat; Powiatowe Centrum		
	Age		MC	Under 25, 25 - 34, 35 - 44, 45 - 54, 55 - 64, Over 65		
	Gender	What is your gender?	MC	Female, Male, Prefer not to answer		
	Teaching experience	Including this year, how long have you been teaching?	MC	Less than 1 year, 1 - 3 years, 4 - 10 years, 11 - 20 years, 21 - 30 years, 31 - 40 years, More than 40 years		
	Current School Experience	Including this year, how long have you been teaching at this school/ institution?	MC	Less than 1 year, 1 - 3 years, 4 - 9 years, 10+ years		
	Classes	What years do you teach	Check boxes	Grade 7 (ages ~12-13); Grade 8 (ages ~13-14); Grade 9 (ages ~14-15); Grade 10 (ages ~15-16); Grade 11 (ages ~16-17); Grade 12 (ages ~17-18); Other		
	Role in School	I am a…	Check boxes	Subject Teacher; Deputy Principal; Principal; Other		
Community of Practice	In-school CoP	How often do you collaborate with your colleagues within your school / institution in the following ways?	Likert Scale: 1 - 5: Never, rarely, sometimes, often, always/almost always. No scoring referenced in paper, so we will use ***mean***	Share new ideas on effective teaching methods	Shear, L., Novais, G., Means, B., Gallagher, L., & Langworthy, M. (2009). ITL research design. https://www.sri.com/wp-content/uploads/2021/12/ITL_Research_design_29Sept09.pdf	https://slideplayer.com/slide/5670447/
				Share and discuss the quality of students' work products		
				Critically discuss our pedagogical practice at the school/ institution		
				Observe another teacher's classroom		
				Plan lessons and units together		
				Discuss student achievement score data with other teachers to make pedagogical decisions		
				Co-teach with another teacher at my school		
				Use technology to facilitate collaboration		
	Online CoP	How often do you collaborate with external colleagues **online** in the following ways?	Likert Scale: 1 - 5: Never, rarely, sometimes, often, always/almost always. **Mean** scoring (not including *other*).	Share new ideas and teaching approaches	Adapted from above	
				Discuss pedagogical practice		
				Co-create lessons or activities		
				Ask for technical advice		
				Ask for pedagogical advice		
				Discuss subject-specific topics		
				Discuss classroom management issues		
				Discuss general education-related topics		
				Other (please specify)		
	Platform for online CoP	What online platforms do you use to collaborate with your external colleagues	Check boxes	Email, Twitter, Facebook, WhatsApp, Slack, Zoom, Padlet, MS Teams, Google Classrooms, Other (please specify)	Made up in-house	
School Culture	Creating a Culture for Innovation/ Change	Please indicate your level of agreement with each of the following statements in relation to your school or institution	5-point Likert: Strongly disagree - strongly agree	There is a high level of trust between all staff	Schein, E. H. (2010). Organizational culture and leadership (Vol. 2). John Wiley & Sons.	Questions derived from the components identified as necessary for creating a culture supportive of innovation and change.
				There is an agreed sense of purpose, with clear vision/values		
				There is an openness to innovation and risk, characterised by resilience and an ability to bounce back from set-backs		
				There is a general readiness for change in the staff.		
				There is a sense of collaboration, collegiality, and interdependence		
				The leadership is shared and enabled across the school		
				There is celebration of learning at all levels of the school community (staff and students)		
Key Skills	Current 21c teaching practices	**Collaboration** - How often do you ask students to	5-point scale: Almost never - Almost daily. Mean scoring	Work in pairs or small groups to complete a task together	Ravitz, J. (2014). A survey for measuring 21st century teaching and learning: West Virginia 21st Century Teaching and Learning Survey [WVDE-CIS-28]. Department of Education, West Virginia. **Also** Hixson, N. K., Ravitz, J., & Whisman, A. (2012). Extended Professional Development in Project-Based Learning: Impacts on 21st Century Skills Teaching and Student Achievement. West Virginia Department of Education.	Adapted in-line with student survey validated in Bray, A., Byrne, P., & O'Kelly, M. (2020). A Short Instrument for Measuring Students' Confidence with 'Key Skills' (SICKS): Development, Validation and Initial Results. Thinking Skills and Creativity, 37, 1-14. https://doi.org/https://doi.org/10.1016/j.tsc.2020.100700. See link to report here: http://www.tara.tcd.ie/handle/2262/97768
				your team		
				Create joint products using contributions from each student		
		Communication - How often do you ask students to	5-point scale: Almost never - Almost daily. Mean scoring	Communicate 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		
		Creativity and Innovation - How often do you ask students to	5-point scale: Almost never - Almost daily. Mean scoring	Test out different ideas and work to improve them		
				Invent a solution to difficult problems		
				Create something new that can help them express their ideas		
		Managing myself/Self-direction - How often do you ask students to	5-point scale: Almost never - Almost daily	Track their own progress and change things if they are not working the way that they should be to complete a task		
				Assess the quality of their work before it is completed		
				Use peer, teacher or expert feedback to change your work		
		Managing information and thinking/Critical thinking - How often do you ask students to	5-point scale: Almost never - Almost daily	single correct solution or answer		
				Draw their own ideas based on analysis of numbers, facts, or relevant information		
				Analyse different arguments, perspectives or solutions to a problem		
		Using technology as a tool for learning - How often do you ask students to	5-point scale: Almost never - Almost daily	email exchanges, giving and receiving feedback, etc.)		
				Use technology to keep track of your work on assignments		
				Use technology to help to share information (e.g., multi-media presentations using sound or video, presentation software, blogs, podcasts, etc.)		
	Elements of B21 approach	For each of the following, please identify the extent to which you use it in your teaching.	5-point Likert: Never/almost never - Daily/almost daily	Teamwork	Tangney, B., Bray, A., Devitt, A., Ní Chorcora, E., Maguire Donohoe, J., Banks, J., Sullivan, K., Keane, L., Byrne, P., Smith, R., & Hannon, C. (2021). Trinity Access - Project	Made up in-house to reflect Breidge21 approach to 21C Teaching and Learning
				Technology mediated learning		
				Project based learning		
				Teacher as facilitator or mentor		
				Peer feedback or individual student reflection		
				Focus on key skills development		

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