The Impact of COVID-19 Restrictions upon Transversal Skills Development amongst Higher Education Students

Teacher Education Advancement Network Journal

Vol 14(1) pages 95-110

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Abstract
Recommendations of the European Parliament and of the Council (2006) defined Transversal Skills as those considered necessary for personal fulfilment, active citizenship, social inclusion, and employment. This study employed empirical qualitative and quantitative methodologies to investigate and understand the perceived impact of COVID-19 restrictions and increased reliance on remote education technologies upon transversal skills development, from the perspective of students of Initial Teacher Education at Stranmillis University College, Northern Ireland. The resulting knowledge would contribute to better informed planning for transversal skills development in Higher Education, and would additionally be of importance to stakeholders affected by COVID-19. This study indicates that more extensive integration of online learning within future higher education programmes would significantly improve the development of many transversal skills, but that a balance should be maintained between online and face-to-face engagement to prevent the regression of other transversal skills and to protect mental health.

Keywords
COVID-19; restrictions; remote education technologies; transversal skills; higher education.

Introduction
Beginning in early 2020, the COVID-19 pandemic resulted in the implementation of strict isolation measures or, 'Lockdown', by governments world-wide, with ongoing restrictions and local lockdowns to help slow the spread of infection. The measures in the United Kingdom (UK) have included unprecedented restrictions on human-to-human contact and gatherings such as within educational establishments (UK Gov. 2020a). Thus, campus activity has been adversely affected for students at UK universities from Monday 23rd March 2020 through campus restrictions and increased reliance on remote education, with use of associated technologies and digital resources (UK Gov. 2020b and UK Gov. 2020c). Consequently, the ability to use physical resources, and interact with other students and people in a conventional physical environment has been extremely restricted or halted, including team or group activities, or activities that mimic the working environment, such as entrepreneurial or placement activities.

Interestingly, the UK government (UK Gov. 2020d) acknowledged the challenges surrounding learning activities that require physical resources. However, they did not explicitly address the challenge within an isolated, remote education setting of developing soft skills (defined as communication; numeracy; Information Communications Technology (ICT); team work; problem solving; and improving one's own learning and performance), or non-cognitive skills (defined as personal traits; attitudes; motivations; socio-emotional regulation; and the ability to work with others) that together are essential for life and work (NI Direct, 2019; Zhou, 2016; West, 2014). These two types of skills have in recent literature been referred to collectively as 'transversal' skills and have required specific types of practical activities to enable their development amongst student populations. Transversal skills were envisioned during the Bologna Process in 1999 (Oleškevičienė et al., 2019) and are considered to be vital and transferable to

Citation
Ievers, M., Cummins, B. and Ballentine, M. (2022) 'The impact of Covid-19 restrictions upon transversal skills development amongst higher education students', TEAN journal, 14(1), pp. 95-110.

any area of knowledge or role, and are seeing considerable attention in research as a result (Viska Project: Briefing paper on Transversal Skills, 2017; Widayanti and Setiawati, 2018; Sa and Serpa, 2018).

There have been challenges surrounding the incorporation of transversal skills with respect to traditional education strategies. Furthermore, there are challenges surrounding students' understanding and awareness of transversal skills, as well as identification of effective tools for assessment and evaluation. There is thus a gap in knowledge relating to the impact of COVID-19 restrictions and remote education technologies on the already challenging development of transversal skills.

Defining Transversal Skills

Transversal skills are considered necessary for personal fulfilment, active citizenship, social inclusion, and employment as they are essential in the knowledge society, and can be learned, are required to adapt to change, and enable meaningful and productive lives (Recommendations of the European Parliament and of the Council, 2006). Six transversal skills categories were compiled by United Nations Educational, Scientific and Cultural Organization (UNESCO) 'Bangkok' (2016) and UNESCO 'Bangkok' (2014) shown in Table 1.

Table 1. Transversal skills (UNESCO 'Bangkok' 2016; UNESCO 'Bangkok' 2014).

Category	**Example Skills**
Critical and innovative thinking	Problem solving, creativity, conscientiousness, entrepreneurship, ability to learn
Inter-personal skills	Presentations, communication, organizing, teamwork
Intra-personal skills	Self-discipline, enthusiasm, perseverance, self-motivation
Global citizenship	Tolerance, openness, respect for diversity, cultural understanding
Media and information literacy	Locating and accessing information, analysing and evaluating media content, digital competence, numeracy and statistics
Other	Inclusion of competencies that may not fit a particular category

The UNESCO categories reflect the original listings of soft skills and non-cognitive skills (Zhou, 2016; West, 2014), along with the University of Chicago's (2012) identification of five non-cognitive skills in an academic context: 'Academic Behaviours' (going to class, doing coursework, organising material); 'Perseverance' (grit, tenacity, delayed gratification, self-discipline, self-control); 'Mind-sets' (a sense of belonging, belief in one's ability to grow and succeed with effort); 'Learning Strategies' (study skills, self-regulated learning, goal-setting), and 'Social Skills' (interpersonal skills, empathy, cooperation).

Traditional memorisation-orientated taught courses without active practical activities (activities such as team projects, entrepreneurial activities, work placements or industrial projects) potentially have little effect on learning outcomes (Mohammed, 2017). However, Skola 2030 (2018) conveys how transversal skills development helps acquire knowledge in different contexts and through different thinking and self-guided learning techniques, thereby strengthening the linkage of new knowledge with personal experience, and independent application of skill in different situations. Indeed, transversal skills largely determine the competitiveness of each member of society and the development of society as a whole (Andersone et al., 2019), with some employers expressing their employee skills preferences as lists of desired transversal skills due to their universality and

importance, to select the most competent workers for each position (Sa and Serpa, 2018; CEDEFOP, 2013).

Waldock (2011), focusing on higher education courses, emphasised the significance of activities such as work placements enhancing a student's employability due to the skills they impart. Furthermore, Waldock (2011) argued that since graduate employability is of high importance to course designers, higher education curricula should incorporate such activities for transversal skills development and promote awareness and understanding of skills development amongst students. In particular, Larraz et al. (2017) discussed how transversal skills are needed for successful graduate performance in the teaching profession, which can hardly be acquired by using a traditional methodology in which students have a passive role.

Transversal Skills Challenges

In contrast to traditional pedagogic or curriculum strategies, which are predominantly theoretical and involve memorisation skills, and high-stakes testing (Sa and Serpa, 2018; Mohammed, 2017; Au, 2007), inclusion of transversal skills development is not prioritised within curricula and assessment. It is often the case that courses already include activities that build transversal skills (Waldock, 2011), but they are not always sufficiently visible to be captured and valued. Thus, supporting the growth of human capital by making knowledge, skills and competences more visible is a common challenge for many countries where important policy elements such as legal frameworks for validation of transversal skills and arrangements for financial support are missing (Viska Project: Briefing paper on Transversal Skills, 2017). There is a need for better methods and tools for identifying, documenting and validating transversal skills, which manifest in normal, routine day-to-day work, and for interventions to improve staff competencies. They are therefore becoming the focus of policymakers and educational organisations world-wide (Andersone et al., 2019; Oleškevičienė et al., 2019; Sa and Serpa, 2018).

The World Economic Forum COVID Action Platform on the Future of Education and Skills

The World Economic Forum established a 'COVID Action Platform' in response to the COVID-19 crisis. An online article authored by Henrietta H. Fore, the Executive Director of the United Nations Children's Fund (UNICEF), and Robert E. Moritz, the Global Chairman for PwC (Fore and Moritz, 2020), was recently published online via the COVID Action Platform, entitled: 'Reimagining the future of skills: what do young people think?' Conclusions confirmed that young people perceived a gap between the skills they were learning in school and universities and those needed for employment, and that COVID-19 had exacerbated this gap. It was perceived that universities could more fully realise the potential of digital connectivity and online learning to improve learning experiences and opportunities, and that the pandemic might actually present a chance to radically change both the mechanisms of delivery and the content of the education and skills that are delivered.

Transversal Skills in the NI Context

The Department for the Economy (DfE) NI published, 'Economy 2030: A consultation on an Industrial Strategy for Northern Ireland' consisting of five pillars, including 'accelerating innovation and research', and 'enhancing skills, education and employability' (DfE, 2017, p. 9). Key economic priorities within these pillars are shown in Table 2. There is a strong focus on access to skills education, and development of skills that are vital for work and life, that are required by industry, and for economic growth in NI. There are clear parallels between these economic pillars and the findings of Fore and Moritz (2020), both of which show close association with transversal skills. Therefore, the potential impact on transversal skills development in NI due to the COVID-19 crisis would in turn impact upon the economic pillars and priorities of the industrial strategy for NI.

Table 2. 'Accelerating Innovation and Research' and 'Enhancing Skills, Education and Employability' growth pillars from the growth framework in, 'Economy 2030: A consultation on an Industrial Strategy for Northern Ireland' (DfE, 2017).

Pillars	Example Priorities
Accelerating innovation and research	A place where innovation, creativity and entrepreneurship are embedded across our entire education system, supporting skills development to meet the needs of industry
Enhancing skills, education and employability	An education system providing young people with skills for life and work
	Access to timely, relevant and comprehensive careers advice
	Help for those furthest away from work
	A high quality, efficient and responsive system for delivering professional and technical skills
	A pipeline of graduates who have skills, knowledge and capabilities to excel
	A strong and relevant supply of skills for economic growth

Investigating Transversal Skills Development

Su et al. (2017) discussed how transversal skills could be measured against a set of valid descriptors. In NI, examples of frameworks that are based upon transversal skills descriptors include a version developed by South Eastern Regional College (SERC) NI, derived from the work of the Tknika Centre of Innovation in the Basque Region (2019) and UNESCO (2016), for use in the assessment of Project-Based Learning (PBL). PBL is defined as a student-centred, active, and engaging approach to learning and transversal skills development (Hoe et al., 2019). The SERC framework focuses specifically on several transversal skills categories relevant to the college, namely: self-management; working with others; participating in society; professionalism; problem-solving and decision-making; numeracy and use of data; digital literacy; and literacy and communication. However, the categories are further broken down into a series of transversal skills with descriptors that are relevant to each category. Similarly, the NI Level 2 occupational framework for Traineeships and Apprenticeships requires the development of eight transversal skills categories including: working with others; problem-solving and decision-making; commitment to work; digital literacy; participating in society; numeracy and use of data; and self-management (People-1st, 2019). The framework emphasised the importance of transversal skills within training activities and employment, as well as the necessity for structured progression throughout training. As a result, the framework makes use of standardised written descriptors to enable assessors to recognise those skills during activities and in student behavioural performance.

Such a framework of skill descriptors informed by the UNESCO taxonomy (Table 1) would thus provide a universal tool for investigation of transversal skills development from the perspective of students in respect to each descriptor. This, in turn, facilitates the assessment of transversal skills amongst students, addressing the effectiveness of education content, delivery and support. Typically, assessment requires student demonstration and teacher observation of skills. Challenges to such assessment practice include variability in the visibility of student skills, and inconsistent observation (Care et al., 2019).

COVID-19 Restrictions and Remote Education Technologies at Stranmillis University College, NI

One example of an affected educational institution and its students is Stranmillis University College (a college of Queen's University Belfast focused predominantly upon Initial Teacher Education), NI. Starting on Monday 23rd March, the students at Stranmillis University College used remote (online) education, supporting technologies and digital resources (specifically, 'Canvas', 'Zoom' and 'Microsoft Teams') to a greatly increased extent (Stranmillis University College, 2020; Queen's University Belfast, 2020). Substantial quantities of lecture materials were uploaded. Formal written examinations were cancelled and replaced by appropriate 'alternative assessments', with coursework assessment tasks largely remaining unchanged and submitted electronically. Course tutors could still be contacted by use of College email accounts for help, support, and guidance, as required, and Student Support and Wellbeing, and Information Technology (IT) services continued to be available for contact. On-campus activity was heavily restricted or halted at various stages of the pandemic, and all further student practical activities and placements were either restricted or cancelled.

Hence, education conditions to which the students were accustomed were altered, with respect to the COVID-19 restrictions. Such a situation may have significantly altered how transversal skills developed amongst the student population. The students at Stranmillis University College in NI provide an example case, with sufficient scope for investigation and understanding of the impact of COVID-19 restrictions and remote education technologies on transversal skills development amongst higher education students.

Methodology

As Winlow et al. (2012) and Creswell (2003) emphasised, the suitability of research methods must be considered in relation to the research aim and objectives to avoid producing unusable results.

Research Aim and Objectives

The research aim and objectives, as underpinned by the literature findings (Section 2), are outlined below. The aim and objectives had a series of data collection requirements that were to be obtained through investigation of student perception and experience.

Aim: Investigate and understand the perceived impact of COVID-19 restrictions and increased reliance on remote education technologies upon transversal skills development from the perspective of students at Stranmillis University College, NI.

Obj. 1: Investigate the perceived impact, from student experience, of increased use of remote education technologies upon transversal skills development.

Obj. 2: Investigate the perceived impact, from student experience, of COVID-19 restrictions upon transversal skills development.

Obj. 3: Contribute to better informed planning for transversal skills development in Higher Education.

Methodological Rationale

Winlow et al. (2012) argue that qualitative methods are particularly suitable for pedagogic research due to the ability to provide uninhibited informative insights into student experiences of the teaching and learning environment, including the effectiveness of course delivery and the adequacy of support networks in place. Surveys delivered through electronic platforms can be used to implement and collect information quickly from a large group (Winlow et al. 2012; Adams and Cox, 2008; Creswell, 2003), and are widely considered to be an important tool in evaluating student experience in higher education (Ammigan and Jones, 2018; Estelami, 2015; Rubaish, 2010). Furthermore, as Ahmad (2018, p. 2) discussed, electronic surveys, 'allow participants the time, ease and ability to refine, expand and

reflect on responses', and, 'increase student response to open-ended questions, which provide qualitative data that is instrumental in improving teaching practices'. Ahmad (2018) and Nulty (2008) discussed the importance of survey response rate as a critical factor in the validity and usefulness of survey data suggesting an approximate minimum of 58% for participant populations $n < 20$, and 35% for populations $n > 50$, as the greater the population size the lower the required response rate. In consideration, for larger populations such as with higher education students, a reasonable response rate within 25 - 35% would be acceptable. Therefore, given the need to investigate student experiences in line with the research aim and objectives, the potentially large number of students at Stranmillis University College ($n = 1120$), and the constraints of the COVID-19 restrictions, the methodology made use of a survey, delivered electronically.

Survey Design

Adams and Cox (2008) stated that a survey is a tool that must be usable and effective so that a participant can easily understand, interpret and complete it, increasing the accuracy of responses. A survey must be unbiased, reliable and valid in measurement (e.g. measuring the correct variables with an analogous measurement scale) thus, placing emphasis on how the survey questions are sequenced, worded and what scales are used, including grouping of questions under common and relatable themes or topics in line with the research aim and objectives. Adams and Cox (2008) also discuss how participants will, in fact, be more motivated to answer if the survey is relatable to the actual experiences they encounter and if it is not unnecessarily long in respect to the number of questions.

As has emerged from the literature, frameworks consisting of relevant transversal skills with descriptors could be used to investigate transversal skills development (Section 2). The survey therefore consisted of categorised questions based on transversal skills descriptors in the context of experiences that the students could realistically relate to, and used terminology that the participants would understand. A five-point Likert scale (Pornel and Saldana, 2013) was used, ranging from 'a lot more/better', to, 'a lot less/worse', with a, 'no change' (neither) and an additional sixth option, 'I don't know', allowing participants to rate their perceived performance of a particular skill for a given description of a relatable experience (a scenario) under COVID-19 conditions. An open-ended 'further comments' question was provided at the end of the survey. Questions on related factors and background information were also used to enhance analysis of responses.

Survey Participants, Sampling and Recruitment

As argued by Winlow et al. (2012) having reviewed Breen (2006, p. 466), in an educational context, a purposeful sample or natural group of participants may be of greater value than a random sample, because if the survey is designed to investigate students' learning experiences, it should consist of participants who have been exposed to similar experiences. As discussed, students at Stranmillis University College were recruited to participate in the survey.

The 'gatekeepers' for the degree programmes at Stranmillis University College were first approached to seek permission for their students' participation, that is the 'Programme Chairs' for a range of degree programmes delivered at the university college. A link to the survey was 'bulk' sent via student emails for recruitment of participants. The email included instructions and guidance on the research and survey including the voluntary nature of participation. This link enabled anonymous access to the survey for completion if the student decided to become a participant. No other direct communication was sent, so no specific students were singled out for recruitment.

Implementation Structure

The survey was initially trialled as a pilot experiment for a two-week period at the end of June 2020. Evaluation of the 100 responses from the pilot led to some minor editing of procedure and questionnaire content.

Full implementation was conducted early in the new teaching year, during November 2020 and whilst still operating under COVID-19 conditions, with online engagement as the overwhelmingly predominant mode of delivery. The survey was active for a period of time, initially set to 2 weeks and then extended by one week so that a minimum response rate of 25 - 35% was surpassed (i.e. above the minimum response rate derived from Ahmad (2018); Nulty (2008)). There were no perceived ethical, physical and/or psychological risks associated with the research. The survey was implemented electronically thus, could be completed remotely, taking into consideration anonymisation and the COVID-19 situation. Participants completed the survey within their own familiar and safe environments e.g. their home. The survey required no additional activity that posed a risk to the participants. The research team have experience of conducting surveys and assessments, including those that are computerised, with the tried-and-tested 'SmartSurvey' platform being utilised in this research.

Ethical Considerations

Winslow et al. (2012) highlighted the importance of informing participants of the aim of the research and their right to withdraw before they participate. Thus, participation was voluntary, and in addition to the recruitment email outlining the voluntary nature of the survey, consent was requested within the introduction to the survey: 'We would trust that your voluntary participation in the survey indicates your consent to these arrangements'. Each participant was also asked to check a 'confirmation-of-consent' within the survey before progressing. Participants could simply not participate by refusing to complete the survey having read the provided introductory information including what the participant is expected to do, and the statement provided on the voluntary nature of participation. Withdrawing or refusing to participate in the survey had no negative consequences for the participants. Given that the participants were students at Stranmillis University College and given that the names and contact email addresses of the researchers were listed on the survey, participants had multiple points of contact if any queries or issues had arisen.

As the survey, candidate introduction, consent and response data were digitally stored using the SmartSurvey platform, confidentiality for the survey was ensured as all information was anonymised at point of interaction. Furthermore, the survey did not ask for any specific identifiable information e.g. name or contact details. Participants were made aware of the anonymisation process as advised by Winlow et al. (2012). The collected survey data was transferred to Stranmillis University College and stored there under password protection for the duration of the research.

Analysis of Results and Findings

The survey was designed to obtain supporting background information, Likert-scaled, and open-ended qualitative data. Following the OSEMN (Obtaining, Scrubbing/cleaning, Exploring/visualising, Modelling and iNterpreting) data pipeline (Li, 2019), the data initially required cleaning to correct minor demographic response spelling mistakes to ensure data consistency (no cleaning was needed for the skills response data), followed by five stages as listed below.

Stage 1: Analysis of each demographic variable and the personal impact variable.

Stage 2: Uni-variate analysis of each Likert-scaled transversal skill variable produced percentage values for the positive and negative response options ('lot less/worse', 'little less/worse', 'little more/better', 'lot more/better').

Stage 3: A rating percentage was then calculated for each transversal skill (Equation 1) and a total rating percentage calculated for each category (Equation 2). The 'no change' (neither) and 'don't know' responses were omitted, focusing on the two negative response options and the two positive

response options to ascertain the sum of the negative and positive swings or tendency and thus, the level of improvement or regression of skill. The analysis enabled production of a ratings chart.

$$\text{Transversal Skill Rating } (R_S) = \left[r_{\%_1} + r_{\%_2} - r_{\%_3} - r_{\%_4}\right] \quad \text{...Equation 1}$$

$r_{\%_1}$ = lot more/better response percentage
$r_{\%_2}$ = little more/better response percentage
$r_{\%_3}$ = little less/worse response percentage
$r_{\%_4}$ = lot less/worse response percentage
n_{S_C} = number of transversal skills within the category

This equation totals the positive (improvement) response percentages for each skill and subtracts the total for the negative (regression) response percentages from the positive totals to produce a 'swing'.

$$\text{Transversal Skills Category Rating } (R_C) = \left[\frac{\Sigma R_{S_C}}{n_{S_C}}\right] \quad \text{...Equation 2}$$

ΣR_{S_C} = sum of the transversal skills ratings for a particular category
This equation totals the swing percentages for all skills within a category, and scales for comparison across categories, by dividing the category total by the number of skills within the category.

Stage 4: Coding of open-ended responses to provide additional insight for comparative analysis with the previous results (Onwuegbuzie et al., 2009).

Stage 5: Interpretation of results, discussion of limitations and findings.

Results and Discussion

The survey response rate was n=343 or approximately 31% of the total student population.

Demographics and Personal Impact Results

The purpose of the demographic analysis was to ensure that the sample was representative of the student population across age, year group, gender, degree pathway and personal impact of COVID-19. There was a clear difference in number of males (14%) and females (84.8%). However, this does reflect the student population, as the number of female students of education is much greater than the number of males. There is a corresponding situation for age, with the majority of students falling within the younger categories. Relative degree pathway populations are again reflected in the demographic results, and there are comparable numbers of respondents from each year group. 94% of respondents were students of Initial Teacher Education. 88.6% of the sample population responded that they have been personally impacted to some degree by COVID-19. Significance testing was conducted to investigate response patterns that may be peculiar to demographic categories, but no anomalous trends were identified, particularly given the small numbers of some categories.

Uni-Variate Results

The 'no change' (neither) and 'don't know' response options were negated to focus on the swing of responses amongst the sample population and the 'no responses' were negligible across the board (<0.58%). In order to understand the raw data, the ratings are required as they show the level of positive and negative tendency.

Ratings Results

The response percentages for each transversal skill variable were converted into a rating, using Equation 1, enabling production of a transversal skills ratings chart for the student sample population

as shown in Figure 1. The chart shows the level of positive or negative tendency across all variables using five positive (+) quintiles and five negative (-) quintiles. The quintile within which a transversal skill rating falls determines the level of improvement or regression of skill as illustrated. As conceptual equivalents, the five quintile levels are referenced in descending order as; very significant, significant, notable, small and very small. Again, the 'no change' (neither) and 'don't know' response options were negated to focus on the swing of responses amongst the sample population and the 'no responses' were negligible across the board (<0.58%). A total rating was calculated for each transversal skills category using Equation 2. The resulting total ratings values are shown across the horizontal axis under its respective category in Figure 1.

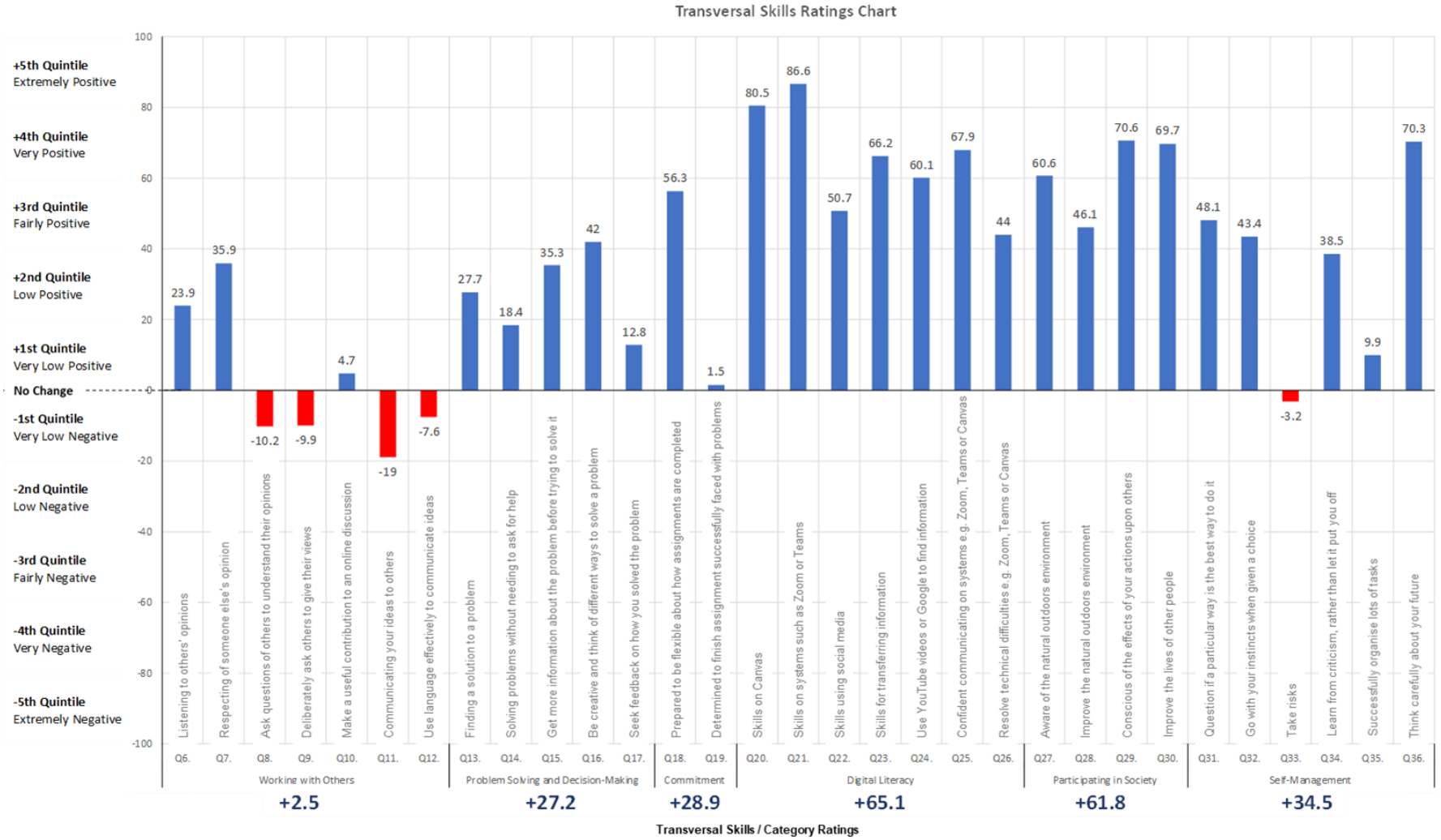

Figure 1. Transversal skills and category ratings chart.

Analysis of open response comments

Out of the 343 participants, 54 chose to contribute additional comments within an open format. This qualitative data has been open coded and analysed by constant comparison (Newby, 2010). Specifically, all the comments from each respondent were logged, and relevant comments were given a colour code to identify the nature of each; then, by continually comparing relevant comments across the respondents, the data could be grouped into five emerging themes. The emergent themes were: mental health, values, skills, university experience, and college-specific experience.

Discussion

[Survey question numbers are indicated by square brackets.]

On average, there has been a small increase in confidence relating to the category of problem-solving [13-17], but a notable increase in the likelihood of a creative approach. These soft skills, as detailed by West (2014) and Zhou (2016), would fall into the UNESCO 'Bangkok' (2016 and 2014) category of Critical and Innovative Thinking. The inclusion within this UNESCO categorisation of entrepreneurship and the ability to learn is reflected in a number of the open response comments:

> COVID-19 has given me the time to do things I've always wanted to do. I've started a YouTube Channel, and I'm planning to start another one alongside this to do with my course, which will hopefully be beneficial to my future. The current channel also has brought me a small amount of income'; 'I read novels for pleasure now and my vocabulary and communication skills have improved significantly as a result.

Such statements indicate the impact of COVID-19 perhaps, more than the impact of remote learning, but they clearly evidence the application of transversal skills. These findings additionally reinforce the Skola 2030 (2018) conclusion that transversal skills support the acquisition of knowledge in different contexts and through self-guided learning techniques; they also reflect the original vision of the Bologna Process (1999), that transversal skills would be required in order to adapt to change. Perhaps paradoxically, there has been a very small decrease in propensity to take risks [33], but, *'Hopefully people continue to be more opportunistic and risk tolerant in future.'*

As a clear illustration of both the impact of remote learning and COVID-19, there has been on average a significant increase in confidence relating to the category of digital skills [20-26], with less certainty relating to social media and resolution of technical difficulties, each being a notable increase. Digital literacy was again identified as a soft skill by West (2014) and Zhou (2016), but would fall this time into the UNESCO 'Bangkok' (2016 and 2014) category of Media and Information Literacy. Significantly, open response comments relating to a negative impact on mental health frequently referenced the experience of digital literacy:

> online work takes so much more brainpower than in-person learning'; 'working online feels so isolating and the constant emails with no face-to-face interactions have been really hard for me. I feel detached from my work and would say I'm on 'survival mode' in terms of completing assignments'; 'I dislike the amount of necessary screen time I am participating in. I find I am more distracted during online lessons and less motivated.

Conversely, for those respondents who further developed their digital literacy skills, there was a correlation with improvements in other transversal skills and a positive impact on mental health:

> Before Covid, I carried out my own tutoring. I switched this all online, which has helped to develop my skills and confidence of online teaching'; 'COVID-19 has allowed me personally to explore the different technical resources such as Flipgrid and Padlet, which I was not aware of; these resources are very useful and could be used within the classroom.

Although citizenship was not explicitly included in the original lists of either soft or non-cognitive skills identified by West (2014) and Zhou (2016), active citizenship was a dominant factor within the vision of the Bologna Process (1999), and was then assigned a category of its own within the UNESCO 'Bangkok' (2016 and 2014) compilation. The findings from this study provide clear illustration of citizenship 'in action'. Citizenship is a term that might sometimes be more regarded as aspirational or idealistic, rather than having a practical impact upon daily life, but three specific outcomes from this study are remarkable: there has been a significant increase in awareness of the natural outdoors environment, together with a notable determination to improve it [27,28]; there has been a significant increase in awareness of the effects of one's actions upon others, together with a significant determination to improve the lives of others [29,30]; there has been a significant increase in determination to think carefully about the future [36]. These outcomes are more probably due to the impact of COVID-19 than the impact of remote learning, as suggested by open response comments:

> The COVID-19 experience has given a lot of time to think carefully about the future'; 'I am a lot more aware. I am thinking more about following my own instincts and being happy above anything else'; 'I do feel I'm making a more concerted effort to try to make lives better.

The UNESCO 'Bangkok' (2016 and 2014) listing defined intrapersonal skills as: self-discipline; enthusiasm; perseverance; and self-motivation. This category of transversal skills derives from the non-cognitive skills of socio-emotional regulation and motivation identified by West (2014) and Zhou (2016), and is perhaps the category most closely associated with open response comments relating to mental health:

> My sole focus is keeping on top of my own mind and thoughts and not letting them overcome me'; 'I hate lock down. It's messed me about something shocking and taken a real toll on my mental health. I hate being inside now. I HATE IT!! To the point I can't concentrate on my study, my ambition to achieve has gone out the windows completely and I honestly don't have a clue what my life is going to look like now.

A pattern consistently observed, however, is the correlation between those who have reported positive mental health outcomes (including new skills development and newly realised values) and references to transversal skills. In other words, open comment respondents (inadvertently or otherwise) have attributed their positive mental health to a transversal skill, and most frequently, the intrapersonal skill of perseverance (UNESCO 'Bangkok', 2016 and 2014), and specifically, adaptability. Such qualitative data may focus upon the impact of COVID-19, but the quantitative responses refer more closely to the impact of remote learning. The quantitative outcomes relating to intrapersonal skills are mixed: there has been a significant increase in flexibility relating to task completion (adaptability) [18], and there has been a significant increase in propensity to question instruction and follow instincts (adaptability) [31,32], but there has been merely a small increase in likelihood to learn from criticism and not be deterred [34], and a negligible increase in determination to finish assignments successfully [19], both of which would relate to self-motivation (UNESCO 'Bangkok', 2016 and 2014).

The soft skill of teamwork and the non-cognitive skill of the ability to work with others (West, 2014; Zhou, 2016) are reflected in the UNESCO 'Bangkok' (2016 and 2014) category of interpersonal skills. This time, the results reflect more the impact of remote learning than the impact of COVID-19, but the findings for this transversal skills category show little to no improvement, and in some instances, regression: there has been a small increase in inclination to listen to others and respect their views [6,7], and a very small increase in contribution to online discussions and management of multiple tasks [10,35], but there has also been a very small reduction in confidence relating to face-to-face

engagements [8,9] and to communication and language skills [11,12]. Open response comments again reflect quantitative results:

> Very stressed - tested positive for corona and emailed my lectures yet some of them still keep trying to get me to turn my camera on'; 'with a lack of any personal and meaningful interactions face to face, university and the subsequent work feels irrelevant to my life.'; 'I do feel less sociable in class scenarios especially when a lot of people don't get involved with the classes and often viewpoints are then ignored and this has probably put me off speaking.

However, conversely, *'I find coming on to campus makes me feel stressed and anxious compared to online learning.'* Such statements reinforce the original vision of the Bologna Process (Oleškevičienė et al., 2019), that transversal skills are necessary for social inclusion, as here there is evidence of correlation between a lack of social inclusion and little development of the most closely associated transversal skill.

Conclusions

It was envisaged in the Bologna Process (1999) that transversal skills are needed for personal development, social inclusion, citizenship and employment. This vision was reflected in the UNESCO 'Bangkok' (2016 and 2014) compilation and reinforced by Andersone et al. (2019), in their assertion that transversal skills determine not only development of the individual, but of society as a whole. This study aimed to provide a better understanding of transversal skills, and to contribute to better informed planning for transversal skills within higher education, by examining the impact on their development that has resulted from remote learning and COVID-19. Such an understanding as a result of this study's findings therefore has potentially significant implications and relevance.

Specifically, this study has found from quantitative and qualitative analysis of 343 responses predominantly from student teachers within Stranmillis University College, Northern Ireland, that the impact of remote learning and 'lockdown' conditions as a result of COVID-19 restrictions has produced indications of significantly improved transversal skills of digital literacy and citizenship; there were also indications of some improvement in problem-solving skills, but notably those related to a creative approach. Indications for intrapersonal transversal skills showed significant improvement only for those relating to adaptability and self-reliance. However, interpersonal transversal skills showed little overall indication of any improvement, with regression indicated in skills related to effective use of language, communication of ideas to others, and confidence to engage with face-to-face communication. References to mental health difficulties were predominant in open response comments, with indication of correlation between mental health difficulties and the practice of online learning. There was consistently correlation between those who reported positive mental health outcomes and references to successful exercise of transversal skills, most frequently, the intrapersonal skill of perseverance (UNESCO 'Bangkok', 2016 and 2014), and specifically, adaptability.

Fore and Moritz (2020) identified both the opportunity for universities to more fully realise the potential of online learning, and the gap that was perceived by students between the skills learned at university and those needed for employment. This study indicates that if post-COVID-19 higher education programmes were designed to more extensively integrate online learning, then many of the transversal skills that students need for personal development and employment would be enhanced, specifically digital literacy, citizenship, creative problem-solving, adaptability and self-reliance. However, this study also indicates that higher education programmes should be designed to maintain a balance between online and face-to-face engagement, in order to protect mental health, and to ensure that the transversal skills of effective use of language, communication with others, and confidence to engage with face-to-face communication do not suffer regression.

References

Adams, Anne and Cox, Anna L. (2008) *Questionnaires, in-depth interviews and focus groups*. In: Cairns, Paul and Cox, Anna L. (eds.) Research Methods for Human Computer Interaction. Cambridge, UK: Cambridge University Press. pp. 17–34.

Ahmad, T. (2018) *Teaching evaluation and student response rate*. PSU Research Review. https://doi.org/10.1108/PRR-03-2018-0008.

Ammigan, R. and Jones, E. (2018) *Improving the Student Experience: Learning From a Comparative Study of International Student Satisfaction*. Journal of Studies in International Education. doi:10.1177/1028315318773137.

Andersone, R., Lama, G. and Raiska, D. (2019) "Development of Non-technical Skills in a Multicultural Environment: Case study in Latvia". International Conference on Applied Research in Education. Warsaw, Poland. 5-7th July 2019.

Au, W. (2007) 'High-Stakes Testing and Curricular Control: A Qualitative Metasynthesis', *Educational Researcher*, 36(5), pp. 258–267.

Breen, R. L. (2006) 'A practical guide to focus group research', *Journal of Geography in Higher Education,* 30(3), pp. 463–475.

CEDEFOP (2013) Piloting a European employer survey on skill needs. Available at: http://www.cedefop.europa.eu/node/11966 (Accessed: 11th November 2019).

Creswell, J. W. (2003) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* 2nd ed. Thousand Oaks, CA: Sage.

DfE (2017) Economy 2030. A consultation on an Industrial Strategy for Northern Ireland. Available at: https://www.economy-ni.gov.uk/sites/default/files/consultations/economy/industrial-strategy-ni-consultation-document.pdf. (Accessed: 01 April 2020).

Estelami, H. (2015) 'The Effects of Survey Timing on Student Evaluation of Teaching Measures Obtained Using Online Surveys', *Journal of Marketing Education*, 37(1), pp.54–64.

EURO-Lex (2006) Recommendations of the European Parliament and of the Council. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32006H0962. (Accessed 01 April 2020).

Fore, H. and Moritz, R. (2020) Reimagining the future of skills: what do young people think? *The World Economic Forum COVID Action Platform*. Available at: https://www.weforum.org/agenda/2020/07/reimagining-future-skills-what-we-learned-young-people?fbclid=IwAR3mGhjT_sTiCRoTJAmUky4GAixG0_r73aJDlMy-Ei_OFw_WA7gtLQXYTL8 Accessed: 09 August 2022).

Hoe, L. S., Chuan, T. C., Hussin, H. and Jiea, P. Y. (2019) 'Enhancing Student Competencies Through Digital Video Production: A Project-based Learning Framework', *Journal of Business and Social Review in Emerging Economies*, 5(1), pp.51-62.

Larraz, N., Vázquez, S. and Liesa, M (2017) 'Transversal skills development through cooperative learning. Training teachers for the future', *On the Horizon*, 25(2), pp. 85-95.

Li, C. (2019) 'Preprocessing Methods and Pipelines of Data Mining: An Overview', *Seminar Data Mining 2016*. Available at /publication/333915926_Preprocessing_Methods_and_Pipelines_of_Data_Mining_An_Overview (Accessed: 09 August 2022).

Mohammed, N. (2017) 'Project-based learning in higher education in the UAE: a case study of Arab students in Emirati Studies', *Learning and Teaching in Higher Education: Gulf Perspectives*, 14(2), pp. 73-86. http://doi.org/10.18538/lthe.v14.n2.294 (Accessed: 09 August 2022).

NI Direct (2019) NI Direct Key Skills Qualifications ». Available at: https://www.nidirect.gov.uk/articles/key-skills-qualifications. (Accessed: 01 April 2020).

Nulty, D. D. (2008) 'The adequacy of response rates to online and paper surveys: what can be done?', *Assessment & Evaluation in Higher Education*, 33(3), pp. 301-314.

Oleškevičienė, G. V., Puksas, A., Gulbinskienė, D. and Mockienė, L. (2019) 'Student Experience on the Development of Transversal Skills in University Studies', *Pedagogika*, 133(1), pp. 63–77.

Onwuegbuzie, A. J., Dickinson, W. B., Leech, N. L., & Zoran, A. G. (2009) 'A Qualitative Framework for Collecting and Analyzing Data in Focus Group Research', *International Journal of Qualitative Methods,* 8(3), pp. 1–21.

People-1st (2019) Northern Ireland level 2 occupational framework for a hospitality team member. Available at: http://people1st.co.uk/getattachment/Insight-opinion/Consultations/Northern-Ireland-work-based-trainingreform/NIOF-Hospitality-Team-Member-final.pdf/?lang=en-GB. (Accessed: 01 April 2020).

Pornel, J. and Saldaña, G. (2013) 'Four Common Misuses of the Likert Scale', *Philippine Journal of Social Sciences and Humanities,* 18, pp. 12-19.

Queen's University Belfast (2020) Covid 19 Information for Students support, guidance and updates for our student community. Available at: http://www.qub.ac.uk/home/coronavirus-faqs/information-for-students/. (Accessed 05 April 2020).

Rubaish, A. (2010) 'On the Contribution of Student Experience Survey Regarding Quality Management in Higher Education: An Institutional Study in Saudi Arabia', *Journal of Service Science and Management,* 03(4), doi: 10.4236/jssm.2010.34052.

Sa, M. J. and Serpa, S. (2018) 'Transversal Competences: Their Importance and Learning Processes by Higher Education Students', *Educational Sciences 2018*, 8(3), pp. 126; doi:10.3390/educsci8030126.

South Eastern Regional College (SERC) (2016) Closing Plenary - Connect More. Available at: https://www.slideshare.net/JISC/closing-plenary-connect-more-with-the-future-andy-mcgregor-and-dr-michael-malone (Accessed: 11th November 2019).

Skola 2030. 2018. Available at https://www.skola2030.lv/lv/par-projektu

Stranmillis University College (2020) Coronavirus (Covid-19) Guidance for Students and Staff. Available at: https://www.stran.ac.uk/coronavirus-faqs/. (Accessed: 18 April 2020).

Su, HFH., Ledbetter, N., Ferguson, J. and Timmons, L'T. (2017) 'Finland: An Exemplary STEM Educational System', *Transform*ations, 3(1), art. 4.

Tknika Centre of Innovation in the Basque Region, 2019. Available at https://tknika.eus/en/.

UK Gov. (2020a) Retrieved from https://www.gov.uk/coronavirus/education-and-childcare. (Accessed: 03 April 2020).

UK Gov. 2020b. Available at https://www.gov.uk/guidance/remote-education-during-coronavirus-covid-19. (Accessed: 7th May 2020).

UK Gov. (2020c) Available at https://www.gov.uk/government/publications/coronavirus-covid-19-maintaining-further-education-provision. (Accessed: 7th May 2020).

UK Gov. (2020d) Available at https://www.gov.uk/government/publications/coronavirus-covid-19-maintaining-further-education-provision/maintaining-education-and-skills-training-provision-further-education-providers. (Accessed: 3rd April 2020).

UNESCO (Bangkok) (2014) Available at https://unesdoc.unesco.org/ark:/48223/pf0000234738_eng

UNESCO (Bangkok) (2016) Available at https://unesdoc.unesco.org/ark:/48223/pf0000246590

The University of Chicago (2012) The Role of Non-cognitive Factors in Shaping School Performance. Available at https://khs.keeneschoolsnh.org/apps/video/watch.jsp?v=205164

Viska Project: Briefing paper on Transversal Skills (2017) Available at https://viskaproject.eu/wp-content/uploads/2020/02/D1.1-Transversal-Skills-and-Validation-Briefing-Paper.pdf

Waldock, J. (2011) Developing Graduate Skills in HE Mathematics Programmes – Case Studies of Successful Practice. York: Higher Education Academy, Mathematical Sciences HE Curriculum Innovation Project. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.mathcentre.ac.uk/resources/uploaded/gradskills.pdf (Accessed: 09 August 2022).

West, M. (2014) The Limitations of Self-Report Measures of Non-Cognitive Skills. Massachusetts: The Brown Center Chalkboard Series Archive.

Widayanti, M., D. and Setiawati, F., A. (2019) 'Project Based Learning Improves 5-6 Years Olds Cooperative Skills', *Advances in Social Science, Education and Humanities Research*, 323. Available at: https://www.semanticscholar.org/paper/Project-Based-Learning-Improves-5-6-Years-Olds-Widayanti-Setiawati/8ba28d0e7a2faebf5c7991118adc51b1d1541b39 (Accessed: 09 August 2022).

Winlow, H., Simm, D., Marvell A. and Schaaf, R. (2013) 'Using Focus Group Research to Support Teaching and Learning', *Journal of Geography in Higher Education*. doi:10.1080/03098265.2012.696595.

Zhou, K. (2016) UNESCO, 'Global Education Monitoring Report'. Education for people and planet: Creating sustainable futures for all. Non-cognitive skills: Definitions, measurement and malleability. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000245576 (Accessed 09 August 2022).