GiLE

Journal of Skills Development

Dear Readers,

Time flies. We are now releasing the second Issue of GJSD, the Journal that is published by the Global Institute for Lifelong Empowerment (GiLE). The occasion of the publication of Issue 2/2021 is an excellent opportunity to *reflect in action*. An opportunity to see if everything is working out as expected, to conclude what are the lessons learned from the challenges we faced, and to review why it was necessary to revise the Journal's internal organisation, editorial processes, and Aims and Scope, as well as to evaluate our promotional efforts in 2021. The year witnessed several exciting developments, but *our vision remains essentially the same*, one year on: GiLE aims to equip rising talent for a future facing humanity today. This future is likely to involve grand changes, challenges and ongoing skills development.

Coinciding with an increasing number of submissions, the changes to our Editorial Team required us to reflect on the Journal's internal organisation, its editorial processes, and the individual contributions of our members. At this point, I am delighted to announce a new, more diverse *Editorial Team*, a group of young people who are fully committed to working hard to improve the content and the reach of the Journal. At the same time, we would like to thank the outgoing team members for all their hard work and contribution to our success.

We updated the *Aims & Scope* of our Journal since all of our stakeholders wish to focus on the human skills – such as behaviours, personality traits and work habits – that significantly enhance the employability of young people. The skill sets required for both "old" and "new" occupations are changing, and it will transform how and where people work. The word "soft skills" is commonly used in contradiction to "hard" (technical) skills, but describing such skills as "soft" should in no way imply that they are less important or easier to acquire. Soft skills are hard to master. It takes years to develop them, and much more than a once-and-done approach is needed to train people to become good at them. Moreover, the need for them is abundantly clear: an adaptable and resilient workforce and society will increasingly need these human skills.

As part of the scope of our scientific journal, and as part of the *GiLE Advocacy pillar* of our Foundation, we introduced new sections that complement the traditional research articles. These new sections include a *Guest column* and a *Food for Thought* section where data-based essays and case studies from the worlds of both education and the corporate world are published. The guest column in the second issue of GJSD is written by Mariëtte Huizinga, the founder of ONE.WHY, who believes that we can create a change if we focus on future skills. The Food for Thought section features a short article written by Dr. Károly Polcz, on the importance of delivering an effective business pitch – a skill that everyone might need in the 21st century.

GJSD especially welcomes research articles from *early-career researchers*. Our team is happy to offer a constructive peer-review process, whereby reviewers provide targeted evaluation with supportive feedback. We are happy that we could support several PhD students who submitted their research papers to Issue 2/2021.

Issue 2/2021 features *seven selected research papers* that altogether discuss two main categories: *education and the world of work*. The correlation between the two is quite apparent, as the available jobs on the labour market set the requirements that education must meet

(employability). At the same time, education affects the development and modernisation of jobs, as well as the quality, skills, and attitudes of the workforce, and ultimately in turn impacts the quality of products and services offered by firms.

The goal of both education and the world of work can no longer be to preserve some kind of status quo in society. Instead, change is everywhere, it is now widely accepted as inevitable, and today's task is to manage it. For their part, educators must now accept *change management* as an integral part of what they do. They must formulate *dynamic, sufficient responses to new challenges,* whether these entail changes to the curriculum or to organisational structures; educational institutions and those who work for them must adapt and respond pro-actively and innovatively, and on an ongoing basis.

The papers of Issue 2/2021 cover relevant and novel topics, such as the importance of curriculum development and learning through collaboration and communication, the need for new consciousness and personal attitudes e.g. growth mindset, metacognition, self-efficacy and neuroplasticity, the beliefs and attitudes that influence learning, or how teaching digitally has become an organic part of modern teaching.

Where the world of work is concerned, papers consider the impacts of the Covid-19 pandemic on future workplaces, well-being and engagement in hybrid work environments, the importance of coaching skills, the new competencies that are required due to techno-social changes, and the impact of intercultural teamwork and communication strategies at the workplace.

We encourage researchers, educators, trainers and those with a non-academic background to read these research papers and to submit a paper to contribute to dialogue with our readership. If you would like to be part of our team, do not hesitate! Please, complete our application form.

With best wishes to all readers, authors and visitors of our website.

Dr. Judit Beke

Dr. Judit Beke is the Editor-in-Chief, Co-creator of the GiLE Foundation

Our world is changing faster than ever. The future seems to be everywhere. Almost at any given moment, we are bombarded by the latest trends, with those in the vanguard of change promising to revolutionise the world. Change is coming fast. But how can we prepare students for jobs that have not yet been created, to tackle social challenges that we can't yet visualise, and to use technologies that have not yet been invented?

With such questions in mind, it may be worth reflecting a little on the rapid technological advances the world has experienced in the last couple of years, or trying to understand the various political, environmental, economic, and social changes transforming our reality today. For many, the direction that will be taken by these undercurrents may be nigh impossible to predict. However, living amid such flux undoubtedly places many of us in situations of high uncertainty. Interestingly, many people believe that the opposite of uncertainty is certainty. But in fact, it is rather being open to what is unknown.

Future Literacy is what we may call the skill that allows people to better understand the role of the future that is to come in what they observe and do. Being future literate empowers the imagination, and enhances our ability to prepare, recover and invent as changes occur. Future Literacy offers an opportunity to take advantage of the unpredictability of the world, looking to the future with curiosity and optimism, and viewing new challenges as instead opportunities for the development (or regeneration) of a new and thriving way of living.

A future-oriented mindset underpins constant and conscious innovation. When we embrace the idea that learning can happen all around us, we experience the joy of learning in our everyday lives. Everyone is learning everywhere. Traditionally, educational practices use the past to understand the present (imagination). By expanding the ways on how to use the future in education, Future Literacy creates opportunities to consciously innovate the present and build better futures – a common aspiration of ONE.WHY.

At ONE.WHY, we also believe that we can't ignore the importance of students attending classes to learn; learning outdoors and in communities helps students to collaborate, make connections, and integrate knowledge into real-world applications. This way, they become problem solvers who discover meaningful connections between what they learn in the classroom and the world around them.

Students need to discover connections between what they learn in the classroom and life outside the school. This boosts their interest to attend school and learn because they realise that the knowledge and skills they learn in school are important to improving life outside the school.

That's why our Future Literacy concept is strongly embedded in the principle of regeneration; our triad of Soil, Soul and Society is based on the premise that in order to build a better society, we need to start out by reshaping our relationships with the Earth and our environment, our desires and senses of fulfilment, and finally our relationship with other human beings, ranging from the closest relationships that we have to the whole human race, restoring a proper sense of the common, real heritage that we all share and therefore must protect.

The Future Literacy concept proposed by ONE.WHY stimulates this virtuous cycle of regeneration, and we believe in the power of education to make it possible. However, it is also

a strategy to engage students – the young individuals who will live through and experience these challenges – due to their power to transform other people and institutions.

As Malcolm X once put it, "Education is the passport to the future, for tomorrow belongs to those who prepare for it today".

Mariëtte Huizinga

Mariëtte Huizinga is the founder of ONE.WHY, a social enterprise driven by a desire to make people resilient to the future. Mariëtte initiates worldwide training courses related to future skills in Brazil, South Africa & Mexico. It's her goal to make learning accessible for everyone everywhere. She believes that we can create a change that matters if we focus on future skills. So let's plant the future together --- www.onewhy.org

GiLE Journal of Skills Development

Pitching as an Entrepreneurial Soft Skill in the World of Startups

Dr. Károly Polcz

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Startup companies in need of capital tend seek investors to fund their business concept. Venture capital and private equity firms along with business angels are also in search of new investment opportunities by organizing startup competitions whereby entrepreneurs pitch their business concept to a panel of investors usually in front of an audience. This is not only an opportunity to raise capital, but also to raise awareness of the company among investors and the general public.

According to Daly and Davy (2016: 182), "an investor pitch is a clear, structured presentation of an idea or product/service […] lasting about two minutes, with the intention of securing funding or business advice from potential investors". An important aspect of the above definition is that the investor pitch is a structured communication event and as such it covers the following main parts along with some storytelling: product or service, value proposition, target demographics, market size, competitive advantage, distribution strategy, financial model and capital needs. The real challenge lies in cramming so much information into such a restricted time frame, though depending on the nature of the event, the pitch may be somewhat longer than two minutes.

Research shows that interpersonal competencies have a significant impact on investor decisions, either consciously or subconsciously (MacMillan et al., 1985; Fried & Hisrich, 1994; Haines at al., 2003). Research by Sanberg and colleagues (1988) found that the entrepreneur's communication skills influence investor decisions in more than 20%. A study by Mason and Rogers (1997) showed that the inadequate presentation of the business plan plays an important role in its rejection. In a later study, Mason and Harrison (2003) asked 30 business angels to view the video recording of an investor pitch. Most of the business angels said that they would have been likely to reject the investment proposal due to the poor quality of the presentation. Clark (2008) asked 24 business angels to assess three investor pitches using a questionnaire with 12 questions related to presentation style and 20 questions related to content. The research found that the higher the score for presentation style, the more likely the business angel was interested in the investment opportunity. Among the factors relating to the style of the presentation, business angels identified the following: clarity, structure, depth and type of information on the investment, as well as the personality and persuasiveness of the entrepreneur. Consequently, Clark (2008) concludes that an entrepreneur who lacks the ability

to persuade and thus cannot make an impact is less successful with investors. It is clear from the above research that communication skills, more specifically the presentation of the pitch, play a crucial role in investors' decisions. This seems to be reasonable insofar as investors are betting their money on an uncertain future in which the only certainty is the entrepreneur. In other words, venture capitalists invest in the personal qualities of the entrepreneur. Therefore, the entrepreneur's communications skills become one of the most important measures of their personality and professionalism.

The ability to convince investors that the business concept is worth funding is of high importance among entrepreneurial soft skills. One of the ways to pursue this goal is to master the art of pitching.

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GiLE Journal of Skills Development

Generic Skills, Academic Achievement, and Means of Improving the Former

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Abstract

In Canada, in general – and in the Province of Ontario in particular – academics, employers, and government agencies are concerned with the low generic skill levels of university students and graduates. The assumption is that such deficiencies detract from academic and job success. Despite this concern, in Canada, research has not focused on potential links between *objectively* measured generic skills and grades recorded in administrative records. In view of this lacuna, the current research has two objectives. First, to assess the net effect of objectively measured generic skills on academic achievement as recorded in administrative records. Second, to determine the efficacy of an online course dedicated to the development of generic skills. Overall, I found that generic skills were better predictors of students' achievement than high school grades used in admission processes; the relationship between high school grades and generic skill levels was weak; students' generic skill levels did not improve over time; and an online course devoted to increasing students' generic skills was effective in boosting skills to an acceptable level. Accordingly, if they are concerned with academic achievement, universities in Ontario and in other jurisdictions in which students are admitted to university primarily based on their secondary school grades might make the development of generic skills a priority; however, unless such skills are demanded across the curriculum, they will atrophy.

Keywords: generic skills, academic achievement, skill improvement

1. Introduction

In Canada, the province of Ontario's Ministry of Education makes it clear that it is important for students in primary and secondary schools to develop various skills and work habits "*in preparation for postsecondary education* [my emphasis] and the world of work" (Ministry of Education, 2010, p. 12). These skills and work habits include: responsibility (e.g., takes responsibility for and manages own behaviour); organisation (e.g. devises and follows a plan and process for completing work and tasks); independent work (e.g. follows instructions with minimal supervision); collaboration (e.g. accepts various roles and equitable share of work in a group); initiative (e.g., looks for and acts on new ideas and opportunities for learning); and self-

regulation (e.g. sets own individual goals and monitors progress towards achieving them) (Ministry of Education, 2010, p. 11). These skills are consistent with the assessments of university instructors and employers of factors contributing to success (Tsui, 2002; Arum & Roska, 2011).

In Ontario, the extent to which students in primary and secondary schools have achieved the Ministry's objectives is decided by students' teachers. There is no external verification of their assessments. As a result, there is considerable variation in the abilities of students who graduate with similar grades from different high schools (Authour et al., 2019; Côté et al., 2020).

In view of these considerations, it is not surprising that in Canada in general, and in Ontario in particular, there is a belief among university faculty members (Côté & Allahar, 2007, p. 42; 2011; Dion & Maldonado, 2013; Hutchins, 2017), employers (Mancuso, 2014), Statistics Canada (Munro, 2014; Statistics Canada, 2016), and journalists (Bradshaw, 2011; Brown, 2016) that students entering into, and graduating from, universities lack the skills essential to academic success and future employment. The situation does not improve over an academic career. Moreover, among young adults already low skill levels have declined over the past decade (Mahboui, 2017). Comparable concerns have been raised in other countries (Shtaltovna, 2021).

With colleagues at the University of Toronto, the University of Waterloo (Waterloo, Ontario), and Western University (London, Ontario), in 2018-2019, I conducted an analysis of the degree to which over 2,500 students in faculties comparable to Liberal Arts & Professional Studies at York University in Toronto, at all levels of study, believed they had the generic skills associated with academic and job success, and with democratic citizenship (Authour et al., 2019). The skills measured were those supposedly developed via primary and secondary school curricula in Ontario.

Despite the provincial objective of developing these skills prior to postsecondary education, only 44% of university students had adequate skill levels. There were no variations by university or year of study. The importance of generic skills was established by the finding that they had a sizeable positive impact on both grades and thoughts of degree completion. At a general level, these findings are consistent with those of other Canadian studies (Statistics Canada, 2016; Finnie et al., 2018; Weingarten & Hicks, 2018).

It is important to note that the pilot study for the multi-university survey was conducted among 100 Introductory Sociology students at York University. Consistent with the results of focus groups carried out among enrolees in Introductory Sociology (Brock et al., 2017), the pilot study (Authour, 2017) found that, skill-wise, 62% of students could be placed in a 'functional' category. The remainder, 38%, were classified as 'at risk'. As was later found in the larger four-university study, the numbers in the categories did not vary by high school grades, level of study, or major (not all students in Introductory Sociology were majors).

Based on information obtained from the sociology pilot and four-university studies, in 2018, I designed an online course, Skills for Success in Sociology (Sociology 1000), intended to provide students with the generic skills associated with academic achievement. The course was first offered in 2019-2020.

The skills on which I focused for the course were those identified by participants in the multi-university study as problematic. However, these skills were not dealt with as abstractions.

Instead, they were embodied in specific activities, like synthesising different points of view, essential to university success. The students themselves may have been unaware that in so doing, for example, they were utilising, and developing, the skills of analysis and synthesis.

Thesis development can be used to illustrate this point. An example of a thesis is: "In this essay I will argue that Liberal Justin Trudeau won the federal election because the Conservatives failed to develop a credible plan to combat climate change." Clearly, this task requires analytical as well as communication skills. The latter are needed to express the former. In formulating a thesis of their own, a student would therefore be required to develop the capacity to analyse and synthesise certain materials and communicate the results of their endeavour in a clear and precise way. The important thing to notice is that instead of the student being aware that they were developing analytic and communications skills per se, they were involved in activities that developed them.

To assess the extent to which the skills developed in this way were important to students' academic success, and to detail the degree to which generic skills can be developed via an online course, I conducted pre- and post-tests in Skills for Success in Sociology (Sociology 1000 B). In these tests students were presented with situations in which they would be required to utilise certain skills cultivated or reinforced through course materials, to answer a question or to solve a problem. Differences between pre- and post-tests would be a measure of how much students had learned in the course. For comparative purposes, the same tests were given in two sections of Introductory Sociology (1010 B and 1010 C).

## 2. Course Design

2.1 Skills for Success in Sociology

Skills for success in sociology was developed for online delivery in a way consistent with the principles of collaborative and experiential learning.

As in Figure 1, students are placed in learning groups. Each group includes approximately five students. In the learning groups, students serve as mentors to one another.

From the students' perspective, the absolute course size is irrelevant. Their course experience is comparable to that of a small seminar embedded in a large course. Each group is led by a weekly rotating chair.

On a weekly basis, group members are individually responsible for addressing a case study, scenario, or series of questions related to information presented via an online course 'workbook' or texts. In many instances, students are required to analyse their life experiences in terms of what they are learning in the course.

FIGURE 1. SKILLS FOR SUCCESS IN SOCIOLOGY COURSE DYNAMICS
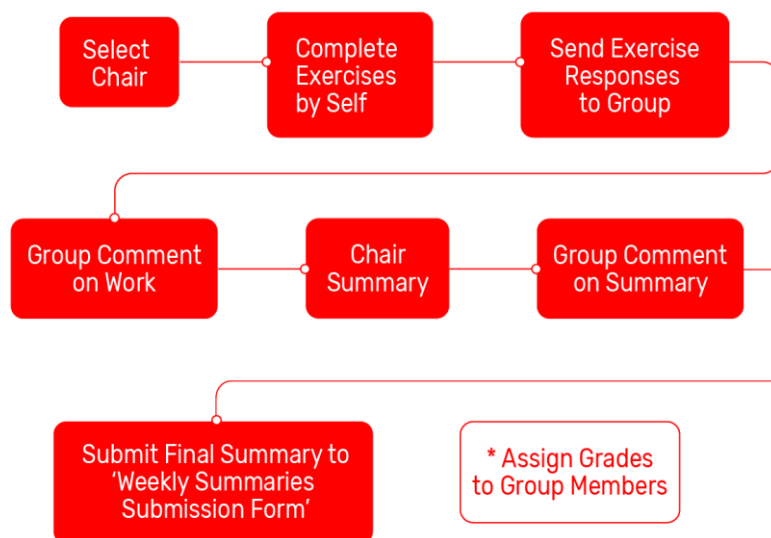
Once they have addressed the case studies etc. students forward their responses to other members of their learning group for comment and discussion. At the end of the discussion a rotating chair synthesises the results. After feedback from the group, the chair then posts, via a report, a synthesis of the group's deliberations to the rest of the class. Based on weekly reports, members of any group are free to initiate discussion with members of other groups.

The instructor provides immediate feedback for these weekly submissions (within one or two days) and gives a group grade. At the end of the year the total grades earned by groups are assigned by its members to individuals in terms of the contribution that they made to the weekly learning tasks. In addition to weekly group work, students submit individual assignments and complete a final test.

More course details can be found at:
https://www.youtube.com/watch?v=RnNtcbNRpjE&ab_channel=PaulGrayson.

Overall, as in Figure 2, the foregoing dynamic is embodied in 23 modules. Using different means, each module is designed to develop, or enhance, students' skills. For example, the module on careers in sociology does not just outline options available to students upon graduation. Instead, these options must be discovered by students through an analysis of relevant quantitative data supplied by Statistics Canada. In essence, students learn about career options and develop their quantitative analysis skills at the same time. In the module on time management class members must develop time management plans suitable to real and hypothetical circumstances. As a result, they enhance their organising skills. The requirements of the weekly reports produced by each group involve the development, and use, of leadership, analytical, synthetic, and communication skills. In essence, the subject matters of each module, and the weekly reports, are vehicles for skills development.

FIGURE 2. AREAS OF SKILL DEVELOPMENT
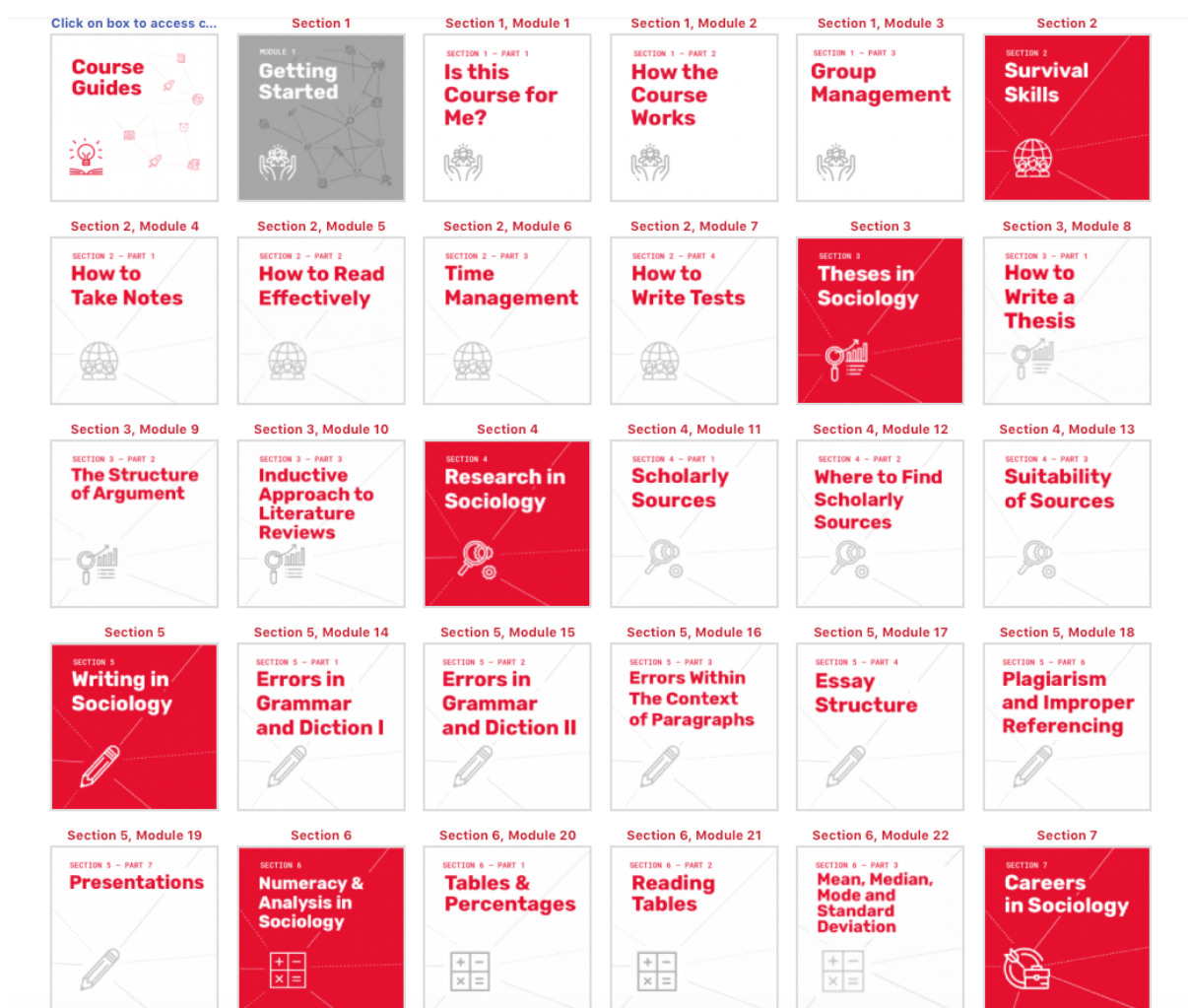
Source: own editing

2.2 Introductory Sociology

Both sections of Introductory Sociology were delivered in-class. Each involved lectures and tutorials. One section included short lectures and considerable in-class group work. In these sections, the focus was on sociology per se. Still, encouragement was given to students to refine particularly their writing skills.

3. Research Objectives

Based on data collected on students in Skills for Success in Sociology (1000 B) and in two sections of Introductory Sociology (1000 B and 1010 C) this article has two objectives:

a) To assess the net effect of objectively measured generic skills on grades derived from administrative records for Sociology 1000 B and 1010 C.

b) To determine the degree to which the skills that contribute to academic success in these two course sections can be developed in a full web course (Sociology 1000 B).

Overall, I will show that, at the beginning of the year, students in these three course sections had relatively low levels of generic skills; however, by the end of the year, particularly those whose skills scores were in the top quartile, had higher levels of academic achievement than others. In addition, students' skill levels were raised substantially in the course dedicated to skills development. As a result, if they are to increase students' level of academic achievement, universities might focus on generic skill development.

Note that the research objectives of, and the methodology applied in, this study received ethics approval from York University.

4. Sources of Information

For this article, information on students' skill levels as measured in Skills for Success in Sociology and two sections of Introduction to Sociology derived from a 60-question test designed to measure proficiency with: time and group management, written communication, numeracy, research ability, critical analysis, and numeracy. The questions were based on insights derived from the four-university study mentioned earlier. A sample question is shown in Figure 3.

It is important to note that test questions were not abstract. Instead, in keeping with previously mentioned considerations, they focused on the performance of tasks required in students' academic lives. For example, a student may have been given a passage similar to what they might encounter in their course readings. They were then asked to identify the thesis embodied in the text. This question, along with others, was a component of the operationalisation of critical analysis identified above. A similar strategy was followed in measuring each of the other important concepts. The underlying assumption of this approach was simple. Once skill gaps had been identified, a course could be developed that would focus on students' skill deficiencies. Approaches such as this are often employed in occupational training.

As discussed elsewhere (Côté et al., 2020), test questions differed from those used, for example, by the Higher Education Quality Council of Ontario (HEQCO). For studies conducted by the latter it was impossible to gain full access to the exact questions; however, from the little information made public, in contrast to those used in the current study, many HEQCO questions focused on skills with a dubious connection to the demands of university life.

During the first week of classes in 2019-2020, *as a course requirement*, students in 1000 B were expected to complete the test. The questions included in the test did not require specific knowledge of course content. As part of course requirements, it was necessary for students to complete the same test at the end of the course.

In 2019-2020, approximately 700 students were enrolled in Introductory Sociology. Almost three hundred of these were taught in Sociology 1010 B and C. As, except for time considerations, students likely enrolled in these courses randomly, for this article, they can be regarded as typical of those in all sections of Introductory Sociology.

While the pre-test was mandatory in Sociology 1000 B, in October and early November of 2019, the test was made available to students in Sociology 1000 B and C; however, it was not a course requirement. As a result, the response rate was approximately 50%. In April 2020, students in these two course sections were also provided with the option of completing the same test a second time. Responses on this occasion were slightly lower. In Sociology 1000 B, and

in 1010 B and C, differences between the pre- and post-tests were viewed as a measure of the development of generic skills over the 2019-2020 academic year.

The pandemic struck in the final month of these courses; however, any effect would have been constant across all three course sections.

FIGURE 3. SAMPLE TEST QUESTION

Before answering this question, note the following definitions:

Passive Reading – reading without analysis or reflection
Active Reading – reading for understanding and retention
Critical Reading – reading to assess author's argument(s)

As Jonas was reading, he realized that the text was primarily based on opinion. This is an example of what kind of reading style?

Select one:
○ a. Passive Reading
○ b. Critical Reading
○ c. Active Reading
○ d. None of the above

Source: own editing

Although in 1000 B and C participation in the two tests was voluntary, those who completed received a bonus mark. As in 1000 B the pre- and post-tests were required, and non-participation resulted in a loss of grades, participation was not an issue.

In preparation for the current analysis, in Sociology 1010 B and C, students who did not complete both the pre- and post-tests were removed from the data file. In addition, the scores of students who took a frivolous approach to the tests were removed. Such students may have, for example, only opened and closed the test. The resulting score would have been zero. After removing from the file those students who did not complete both tests, or those who were frivolous in their approach, the number of students available for analysis was 96. Of this number, 14 were enrolled in 1000 B, 34 in 1000 B, and 48 in 1010 C. Because of these measures, those included in the analysis are not necessarily representative of students in 1010 B and C.

In view of the number of respondents, the response rate for 1010 B and 1010 C, the exclusion of students who did not respond to both the pre- and post-tests, and the removal of frivolous responses, the sample cannot be regarded as representative of all students in various sections of

1010. That being said, given the consistency between the results of this and prior studies, it is unlikely that the general patterns identified in the sample were random.

In addition to the diagnostic test, 'objective' information for this article was provided by Institutional Research at York. More specifically, administrative data were obtained for: high school grades, course grades for 1000 B and 1000 B and C; overall GPA for 2019-2020; cumulative GPA; number of credits completed in 2019-2020; cumulative completed credits; age; and sex. This information was merged with the results of the pre- and post-tests.

5. Course Profiles

There was a considerable difference between, on the one hand, students in 1000 B, and, on the other, those enrolled in 1010 B and C. These differences are important for two reasons. First, studies at York and elsewhere have demonstrated that the best predictor of future success is past success (Authour, 2004; 2008; 2011). More specifically, in any one course or in any one year, the best predictor of academic achievement is high school grades (despite their inflation) (Côté & Allahar, 2007, 2011) and previous GPA. Indeed, although far less now than in the past, high school grades have continued to have an independent effect on achievement even after four years of study at York, the University of Toronto, Waterloo, and Western (Authour et al., 2019), at least in studies that have not included measures of generic skills. Second, students' abilities, manifested in different ways, are associated with phenomena such as attrition at the course or university level and with student satisfaction. As a result, it is reasonable to expect different course outcomes depending upon class profiles.

Overall, the high school grades of students in 1000 B, 1010 B, and 1010 C were 75%, 83%, and 82% respectively. These differences were statistically significant (F sig. = .03). Perhaps even more important than differences in means is the within course distribution of grades. To determine this measure, I calculated the quartile distribution of high school grades across all courses. I then examined the quartile distribution by course. The results are seen in Figure 4. As seen in the figure, the largest percentage of students (75%) in 1000 B were in the lowest (first) quartile. By comparison, the corresponding figures for 1010 B and 1010 C were only 20% and 41% respectively. At the other end of the spectrum, only 8% of 1000 B enrolees were in the fourth quartile (highest). The corresponding figures for 1010 B and C were 33% and 24% respectively. In 1000 B, the students' academic limitations expressed in the Figure were evident over the academic year.

FIGURE 4. QUARTILE DISTRIBUTION OF HIGH SCHOOL GRADES BY COURSE
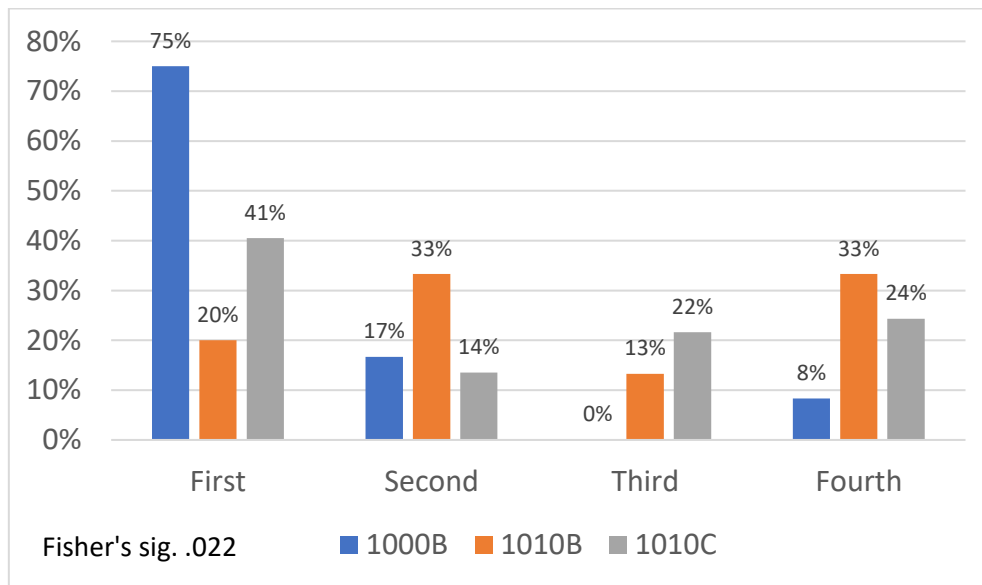
Source: own editing

Some manifestation of the limitations of students in 1000 B is found in Figure 5. It presents the overall student GPA for 2019-2020. Although not statistically significant, consistent with the foregoing, the achievement of students in 1000 B was considerably lower than in the other course sections. While the course average, on a nine-point scale, for students in 1000 B was 5.9, it was 6.8 and 6.6 for 1010 B and C respectively. Similarly, cumulative GPA (over all years of study at York) for 1000 B was only 5.6. For 1010 B and 1010 C it was 6.6 and 6.3 respectively.

FIGURE 5. OVERALL GPA 19-20 BY COURSE
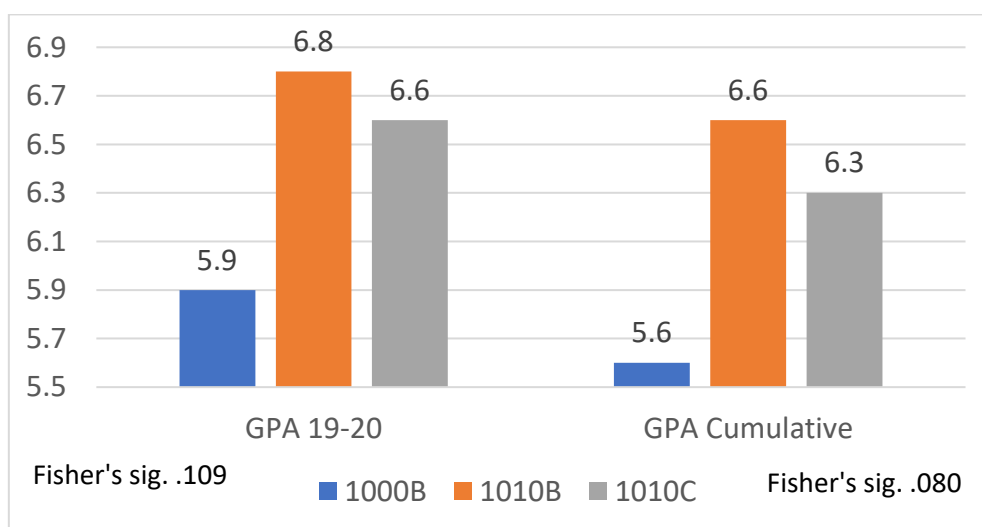
Source: own editing

A similar disadvantage is found in Figure 6. Here we see that in 2019-2010, 1000 B students completed only 19 credits. Those in 1010 B earned 26 credits and enrolees in 1010 C completed 24. These differences were statistically significant. When overall completed credits were examined, the reverse was true. The greatest number was achieved by those in 1000 B – 46. By comparison, the completions for 1010 B and C were 41 and 37 respectively; however, these differences were not statistically significant.

FIGURE 6. COMPLETED CREDITS BY COURSE

Fisher's sig. .001   ■ 1000B ■ 1010B ■ 1010C   Fisher's sig. .416
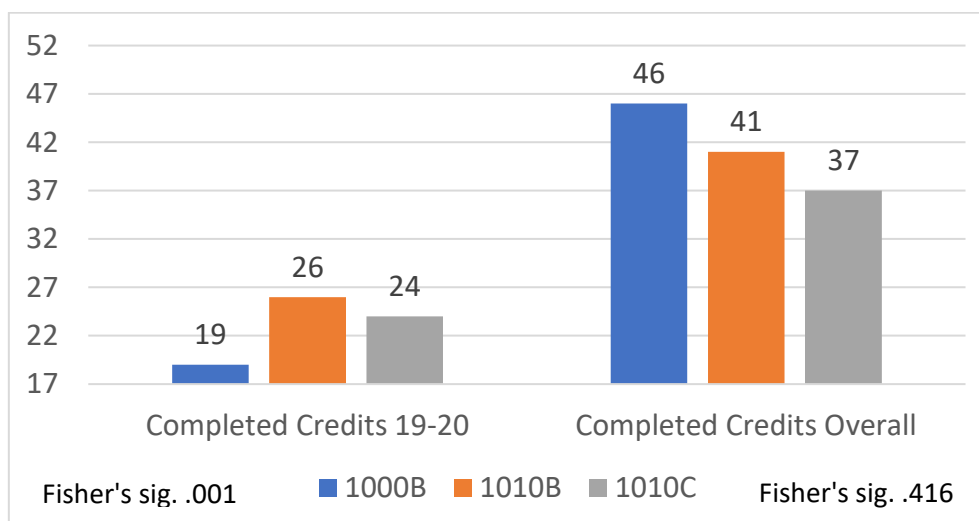
Source: own editing

The latter findings do not contradict the former. The greater number of completed credits for 1000 B could easily be the result of having been enrolled longer than students in the other course sections. The ages of students in each of the course sections were consistent with this possibility. From Figure 7 we see that the average age of those in 1000 B was 28. For 1010 B and C it was a much lower 20 and 19 respectively. These differences are statistically significant. Collectively, the figures suggest that students in 1000 B had lower levels of achievement, completed fewer credits in 2019-2020, and were significantly older than students in the other course sections. From one point of view this is a positive finding. Sociology 1000 was designed to meet the needs of students with low levels of generic skills.

6. Pre- and Post-Tests

Despite the foregoing disadvantages of students in 1000 B, as shown in Figure 8, there were no statistically significant differences in the pre-test scores of students in all three course sections. The average score of students in 1000 B was 65%. For 1010 B and C it was 64% and 65% respectively. Whether or not these scores are consistent with the primary and secondary school generic skills goals of the Ministry of Education as articulated earlier is up for debate.

The relationships among pre- and post-tests scores and other variables are found in Table 1. As expected, there was a low but statistically significant correlation of .26 between high school grades and GPA for 2019-2020. Notwithstanding this association, the correlations between high school grades and the pre-tests (.18) and post-tests (.03) were small and not statistically

significant. Consistent with the four-university study referenced earlier, *this finding indicates that elevated grades in high school are not to be confused with the acquisition of generic skills.*

FIGURE 7. AGE BY COURSE
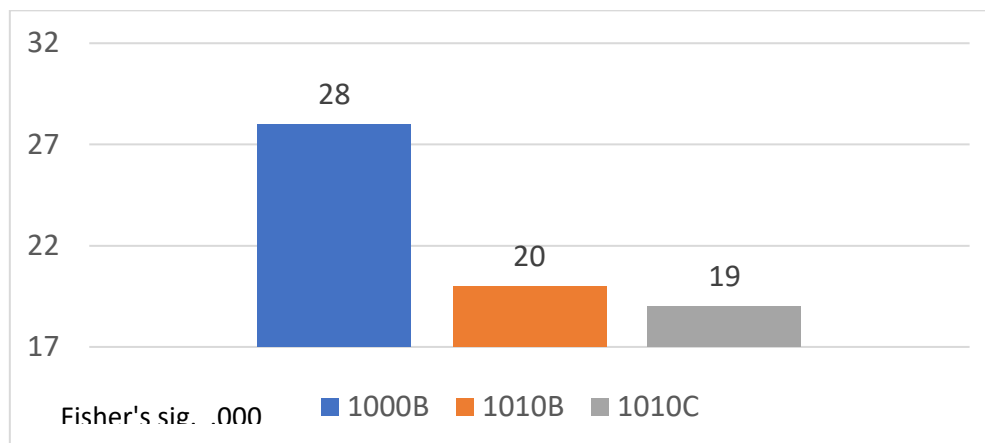
FIGURE 8. PRE- AND POST-TESTS BY COURSE SECTION
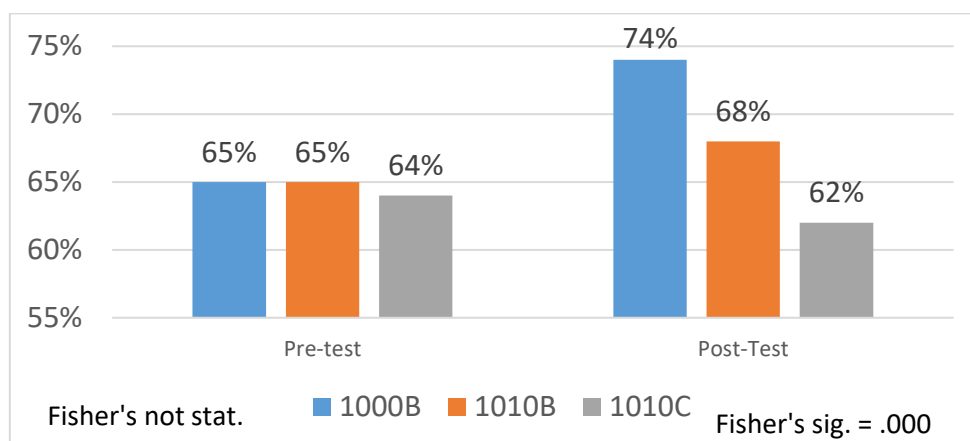
TABLE 1. CORRELATION MATRIX

	High School Grade	**GPA 19-20**	**Pre-test**	**Post-test**
High School Grade	1.00			
GPA 19-20	.26*	1.00		
Pre-test	0.18	.30**	1.00	
Post-test	0.03	.33**	.35**	1.00
* Correlation is significant at the 0.05 level (2-tailed)				
** Correlation is significant at the 0.01 level (2-tailed)				

To return to Figure 8, despite there being no difference in the pre-test scores among the course sections, the opposite is true for the post-test. On this test, the scores of those in 1000 B (74%) were higher than those for 1010 B (68%) and 1010 C (62%) respectively. Overall, these differences were statistically significant. In addition, a paired samples test indicated that while differences between the pre- and post-test for 1000 B were statistically significant (t sig. .01), differences for the other two course sections were not. This finding is to be expected. While sections of 1010 may attempt to develop students' generic skills, their main mandate is to introduce students to sociology.

To identify the relationship between students' attributes and the results of the pre-and post-tests (not shown in graph or table form) test scores were regressed on high school grades, cumulative GPA, and the number of overall completed credits. For the pre-test, there was no statistically significant relationship among high school grades, cumulative GPA, and number of completed credits. The most important finding of this analysis was that more senior students (as measured by completed credits) did no better on the pre-test than new entrants to the university. Quite simply, their generic skills likely did not improve because of their time on campus.

The results of post-tests were regressed on high school grades, cumulative GPA, and number of completed credits. For this analysis, pre-test results were also included. In this procedure, only pre-test scores made a statistically significant contribution to the equation (beta = .28; t = .01). *These findings indicate that the post-test skill levels of students with decent high secondary school grades were no better than those with low grades.*

7. Academic Achievement

All else being equal, to what extent is academic success a function of generic skills? In answering this question, only data for 1010 B and C were used. The reason for this focus is that, in 1000 B, the questions in the pre- and post-test test were part of the final course test. As a result, an analysis of the impact of test scores on final course grade in 1000 B would include a degree of redundancy. Unfortunately, because of the relatively few students in 1000 B, and the low ratio of participants to independent variables, it was not possible to conduct the same regression as for 1010 B and C for 1000 B alone.

The results of the analysis for only 1010 B and C are shown in Figure 9. From the figure, two conclusions are evident. First, in Sociology 1010 B and C, neither high school grades nor pre-test scores had a statistically significant effect on course grades. By contrast, the effect of post-test scores (beta = .31) was statistically significant. Moreover, the effect was greater than the effects of high school grades and pre-test scores combined (.24). The overall statistical significance of the model was .01.

The implications of the foregoing can be illustrated by the following hypothetical example. Student A had a high school grade of 75%. Her scores on the pre- and post-tests were 50% and 55% respectively. From the regression, her predicted course grade was 72%.

Student B also had a high school grade of 75%. In addition, she achieved 50% on the pre-test. At the end of the course, however, her post-test increased to 85%. As a result, her predicted course grade was 81%. In other words, the increase in skills resulted in a 9% gain when compared to student A.

Despite the foregoing, a word of caution is appropriate. The standard error of the estimate was 6.9%. Therefore, results should be treated carefully. (As will be seen later, dividing post-test scores into quartiles results in a clearer picture of the relationship between generic skills and academic achievement).

Judging from Figure 10, a similar effect for 1010 B and C was evident for overall grades for 2019-2020. Once again, neither high school grades nor pre-test scores had a statistically significant effect. By contrast, the effect of the post-test (beta = .24) was almost equal to the combined effect of the other two variables (.26). In addition, it was statistically significant. The overall significance for the model was .02.

The implication of the foregoing is simple. Despite prior academic qualifications, students' generic skills, as measured in the post-test, are better predictors of course grades in 1010 B and C than either high school grades or the results of pre-tests.

FIGURE 9. BETAS FOR REGRESSION OF COUSE GRADE FOR 1010 A AND B
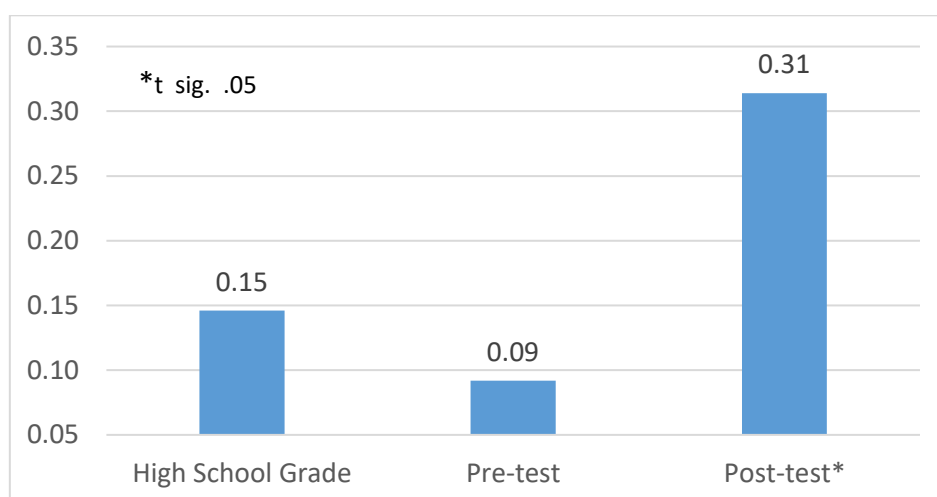
Source: own editing

FIGURE 10. BETAS FOR REGRESSION OF OVERALL GPA FOR 1010 B AND C 2019-2020
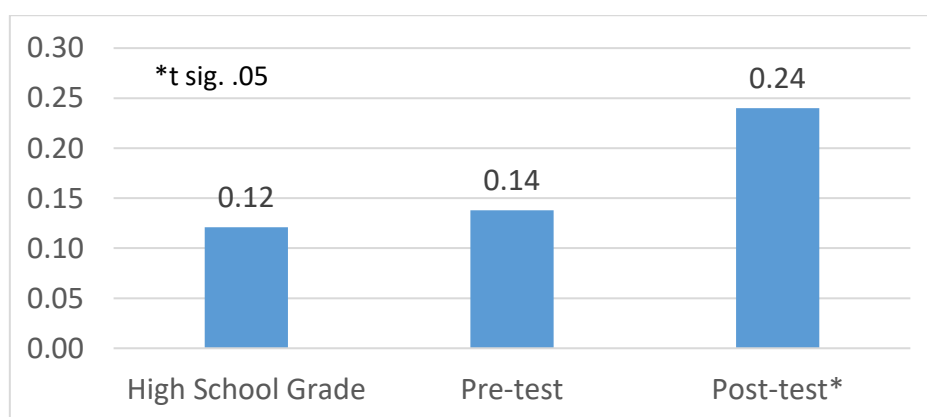
Source: own editing

The same is true for students' overall grades in 1010 B and C for the 2019-2020 period. Subject to qualifications to be raised later, the foregoing analysis suggests that if a way is found to deal with students' skill deficits, those with low entering averages might not be at an academic disadvantage over the long run.

8. Achievement Groups

To present an easily understood picture of the foregoing, a two-step cluster analysis was employed. Because of the previously noted overlap between post-test scores and final grades in 1000 B, the results for 1010 and 1000 were analysed separately. High school grades, course grades, and post-test scores were included in the procedure. The results are presented in Figures 11 and 12. To facilitate graphing, predictor importance was expressed in percent (instead of 1, .4, etc.).

As seen in Figure 11, in 1010 B and C, two clear groups emerged from the analysis. Forty percent (40%) of students fell in what has arbitrarily been termed a high achievement group. The remaining 60% comprised low achievers.

The former group compared to the latter is characterized by high post-test scores (73% vs 61%); high course grades (82% and 75%); and high secondary school grades (87% vs 79%). Predictor importance is a measure of the importance of each variable to group classification. Consistent with the previously discussed regression results, post-test scores are of overwhelming importance to group placement. The average silhouette measure of cohesion and separation was .4 (fair). A discriminant analysis revealed the differences between the groups to be statistically significant.

FIGURE 11. CHARACTERISTICS OF ACHIEVEMENT GROUPS 1010 B AND C
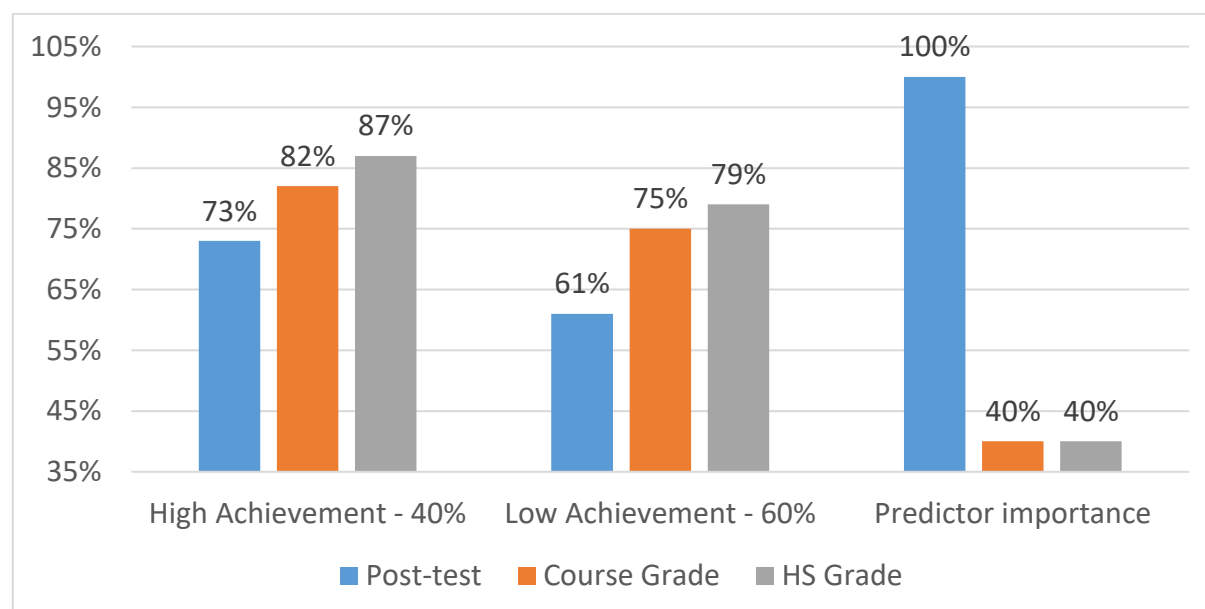
Source: own editing

FIGURE 12. CHARACTERISTICS OF ACHIEVEMENT GROUPS 1000 B
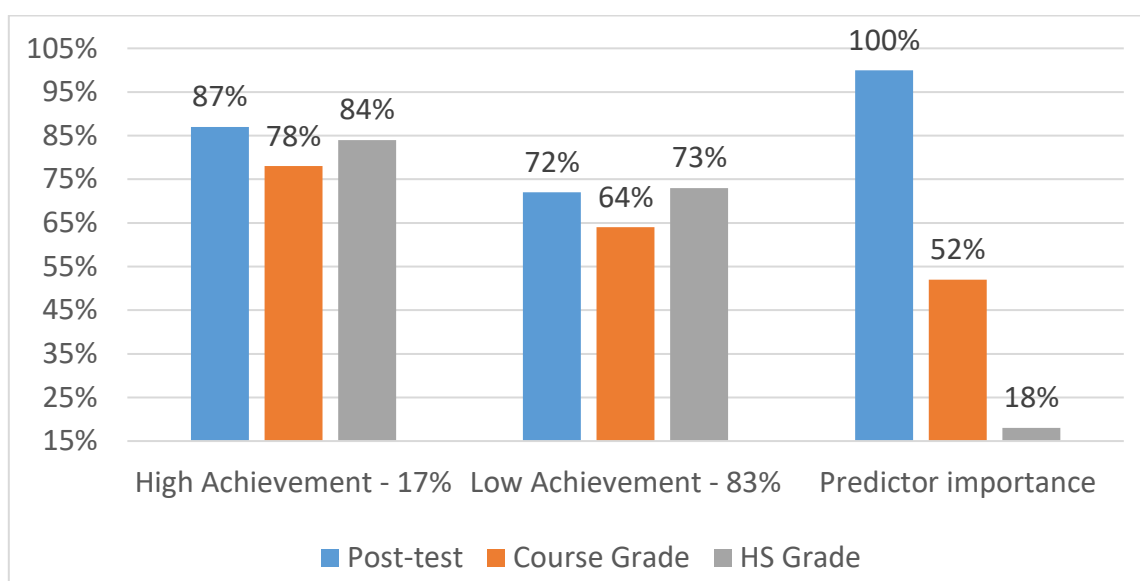
Recall that the number of independent variables in regression analyses precluded the inclusion of students in 1000 B in certain procedures. This was less of a limitation in cluster analyses. Still, because of low numbers, results should be treated with caution.

This qualification notwithstanding, the figures in Figure 12 are comparable to those in Figure 11. Compared to low achievers, high achievers had high scores for: the post-test (87% compared to 72%); course grades (78% vs 64%); and high school grades (84% and 73% respectively). By far, post-test scores are the most important predictor of group placement. The average silhouette measure of cohesion and separation was .7 (good). The results of a discriminant analysis indicated that differences between the two groups were statistically significant.

The implication of these two cluster analyses is clear. In both 1000 B and 1010 C and B students could be divided into two groups. In each, group placement is consistent across measures of high school grades, course grades, and particularly post-test scores: there are no contradictory defining measures. Moreover, particularly in 1000 B, high achievers are a minority.

9. Practical Considerations

While the foregoing contributes to an understanding of the general relationships among high school grades, generic skills, and academic achievement, more information is needed if the data are to be used to inform potential curricular changes. More specifically, what level of skill development makes a difference in terms of academic achievement?

An answer to that question was provided in the following way. First, scores on the post-test were divided into quartiles. Second, dummy variables were created for each quartile. Using the lowest quartile as a reference category, course grade was then regressed on high school grades, and quartiles two, three, and four. The results are shown in Figure 13.

The figure shows that, consistent with previous analyses, the beta for high school grades was a low .18. When compared to students in the lowest quartile, the increase in grades for those in

quartiles two and three was minimal. Betas were .13 and .16 respectively. Moreover, high school grades and being in the second and third quartiles did not contribute to academic achievement in a statistically significant way. By contrast, post-test scores in the fourth quartile compared to the first, with a statistically significant beta of .48, had a considerable impact on course grades. Put plainly, the foregoing indicates post-test scores under 75% are of little consequence for academic achievement. The overall model is statistically significant (.01).

What does the foregoing mean in terms of concrete grades? To answer this query, an analysis of covariance was carried out with course grade as the dependent variable. High school grades were specified as a covariate. The estimated grades for those in quartiles one, two, three, and four were 75%, 77%, 77%, and 83% respectively. Differences between the grades of quartile four and each of the others were statistically significant. The significance level for the overall model was .01.

Consistent with prior analyses these results indicate little difference in the course grades of students in the first three quartiles. By contrast, there is a statistically significant increase in course grades for those in quartile four compared to all others (the figures also show that students with weak generic skills are still able to obtain B+ averages for the course).

FIGURE 13. BETAS OF POST-TEST QUARTILE CONTRIBUTION TO ACADEMIC ACHIEVEMENT
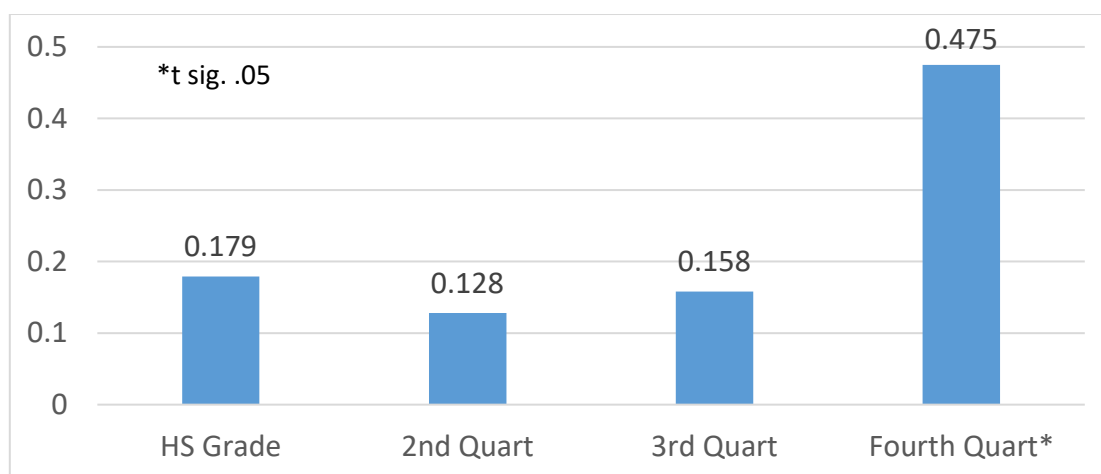
Source: own editing

Why are skills scores in the first three quartiles of little relevance to measures of academic achievement? One possible explanation involves the realization that in many large courses the evaluation of students is based on tests. The utilization of, for example, analytical and writing skills may be required for a relatively low portion of the overall grade. As a result, as long as students have test writing skills, they can expect to do well.

A second possibility is that given the low level of students' skills, were instructors to insist on 'high' standards, they would be penalized by students in course evaluations. This possibility would be of particular concern to precarious instructors. They might feel that the awarding of low grades, via resulting unfavourable teaching evaluations, could have implications for future university employment. Also, in most universities, instructors are required to explain why their

grades might deviate from accepted norms. In any given situation, each of these possibilities may be at work (Côté & Allahar, 2007, 2011; Authour et al., 2019)

10. Consistencies Across Studies

As noted earlier, the current study was built on a prior survey of Introductory Sociology students and a separate survey of students in faculties comparable to York's Liberal Arts and Professional Studies at the University of Toronto, the University of Waterloo, and Western University. Although these studies were based on students' self-assessments of their skills, the results were consistent with the current study, based on objective measures.

Before summarizing these similarities, in the current analysis, in order to identify 'natural breaks' for the pre-test, a univariate two step cluster analysis was conducted (Fournier et al., 2007; Sriwanna et al., 2016). The procedure resulted in the identification of two groups. The largest group, comprising 72% of the sample, had an average pre-test score of 74%. The remaining 28% were defined by a score of 51%. These figures indicate that 28% of students studied have low levels of generic skills. The average silhouette measure of cohesion and separation was .7 (good). The results of a discriminant analysis indicated that differences between the two groups were statistically significant.

A summary of the findings of the current objective study and prior surveys resulted in four points of similarity and difference.

a) The survey of sociology students referenced earlier found that while 62% of students could be considered 'functional' in terms of generic skills, 38% were at risk. In the four-university study only 44% were functional. The current study indicates that based on 'objective' measures a higher 72% might be viewed as functional. There are two possible explanations for the higher numbers defined as functional based on objective measures.

First, the foregoing classifications (functional, at-risk), for all studies, were based on the results of cluster analyses. As such, the emerging groups are a function of natural breaks in the particular data set rather than on the basis of an external criterion. As a result, variation is to be expected. This said, independent of methodology, *each study identified many students with low levels of generic skills.*

Second, the completion of the diagnostic test required more intellectual commitment on the part of responders than the survey. As a result, it is possible that the skills of those who chose to complete tests in 1010 B and C were higher than those of non-responders. Even were this the case, in view of effect sizes, the likely consequence of any resulting bias would have been minimal.

b) In the sociology and four-university surveys, and in the current undertaking, there was little association between high school grades and generic skill levels.

c) In the survey of sociology students, the four-university study, and in the current endeavour, skill levels did not vary with level of study. In other words, time on campus did not translate into generic skill improvement.

d) In the two surveys, and in the current study based on objective information, generic skill levels were the best predictors of academic achievement. High school grades, that are the primary basis for university admission, were of minor consequence.

11. Conclusion

In Ontario, as in some other jurisdictions, students' teachers are responsible for assessing the degree to which students meet educational objectives at the primary and secondary levels. There are no external criteria with which their evaluations are compared. As a result, the skills and abilities reflected in grades awarded in high schools can vary from one institution to the next. It is for this reason that although many high school graduates in Ontario achieve good grades, their generic skills are often insufficient to the challenges of university and employment.

In the Introduction I showed that in Canada in general, and in Ontario in particular, students' and graduates' lack of generic skills has not gone unnoticed. Concern has been expressed by educators, employers, and journalists. While each might have unique interests, overall, there is an assumption that low skill levels are inconsistent with academic achievement and job success. Unfortunately, in Canada, until now, studies attempting to link objectively measured skill levels to high school and university grades have not been conducted.

In this study, I was able to link objective measures of generic skills to academic achievement. Overall, I found that:

a) There was a weak association between high school grades, the central criterion used in university admission, and generic skills.

b) In university, generic skills were better predictors of academic achievement than high school grades.

c) Generic skills did not increase with the number of courses completed by students.

I also found that students' generic skill deficiencies can be remedied through their taking an online course on skills development. Via this course students were able to bring their skill scores (as measured in the post-test) up to 74%. As a result, they were only 1% lower than the threshold of 75%. Scores of at least this magnitude were of considerable consequence for academic achievement.

Overall, in some jurisdictions, like Ontario, entrance to university is based primarily on the evaluations of students' teachers. As a result, assumptions about the validity of high school grades, and the degree to which they signify readiness for the challenges of university and the future job market, must be made cautiously. Should additional studies confirm current findings, where appropriate, universities might consider making courses designed to remedy skill deficiencies readily available.

12. Discussion

All else being equal, the results of this analysis indicate that, in 1010 B and C, generic skills, as measured in the post-test, particularly were they in the fourth quartile, contributed to high course grades and to overall academic achievement. Moreover, as shown for 1000 B, it is possible to increase students' skills almost to the level of the fourth quartile.

The results of this study point to the possibility, via a dedicated course on skills development, of increasing students' generic skills to an acceptable level. This finding does not rule out the possibility of there being other ways to achieve the same objective.

There is, however, a note of caution. Were generic skills developed in whatever way not demanded in other courses, they would atrophy.

In addition to information presented in this article, my experience as the instructor for 1000 B is relevant to an understanding of the difficulty of increasing students' generic skill levels. In the course it was clear that while students developed *knowledge* of certain skills, *application* was a different matter. For example, the course included a module devoted to developing and researching a thesis for an essay. While students encountered no difficulty in answering several test questions dealing with theses, some subsequently showed an inability to develop their own thesis for a required essay. When confronted with this challenge, rather than following the example of a module on thesis development, they regressed to approaches that had likely served them well in high school or in other courses. The same problem emerged in the course offered in 2020-2021.

More specifically, in the thesis module students were advised that a thesis should be of the following format: "In this essay I will argue that Justin Trudeau won the Canadian election because the Conservatives failed to present a coherent policy on climate change." Instead, the better students wrote variations of: "In this essay I will examine the factors contributing to the election of Justin Trudeau." While the difference may seem small, analytically, it is huge. Not only did most students miss the point the first time, in many cases it took three more attempts before they got it right.

This point is mentioned because if we are to be successful in developing students' generic skills, we must do more than provide them with new knowledge. We must also ensure that this knowledge is embodied in practice, and that students do not revert to past practices. Faculty with tenure are in the best position to meet this challenge. More than others, they are relatively immune to student push-back.

Overall, we must devise ways of ensuring that students develop the capacity to apply generic skills to their academic endeavours. This objective cannot be accomplished only through a course, or courses, that focus on, or include, knowledge of relevant skills. Offerings such as these must be accompanied by efforts, across all courses, to ensure that students are rewarded for their utilization of generic skills.

13. Limitations

The first limitation of the current research is that despite in most cases statistically significant results, the number of students on which the research is based is relatively small. This is particularly true of Sociology 1000 B.

A second limitation is that it was not possible to determine if courses on skill development offered in traditional in-class fashion would be as efficacious as the online option. Quite simply, the required traditional courses were unavailable. Were an assessment of the relative efficacy of web delivery to be undertaken, it would be important to note that the relevant comparison is not between online and traditional courses. Rather, it is the degree to which either can embody effective teaching and learning and practices. There are both good and bad traditional and online courses.

Third, we should not readily assume that findings deriving from a sociology program are automatically applicable to other disciplines. That being said, considerable numbers of students in Introductory Sociology and in Skills for Success in Sociology were from disciplines other than sociology.

Fourth, and consistent with the foregoing, we also should not too readily accept the notion that findings from one institution can be generalized to others. For example, university student bodies vary by characteristics like class, race, first language, and sex/gender. In addition, institutions have varying entrance requirements, cultures, and release their students into different labour markets. For reasons such as these it would be misleading to automatically assume that successful measures initiated in one institution will likely work elsewhere. Before introducing courses/programs to deal with skill deficiencies, universities should seriously consider the peculiar characteristics of their students.

Acknowledgement

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Curriculum development as a tool for professional development: Teacher learning through collaboration and communication

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Abstract

This study investigates teacher participation in national curriculum development in Myanmar. The purpose of this study is to explore teacher learning and reflection during the process of curriculum development through collaboration and communication. A qualitative research method has been applied in this study. Six participants participated in the study through individual interviews. The participants include six school teachers from Basic Education High Schools, specifically, two curriculum developers, two teachers who delivered the subject content of the new curriculum to their colleagues and two school teachers who were trainees for the content. The results showed that teachers experienced significant development in their professional knowledge, especially in their understanding and connection to the subject matter content across different grades and pedagogical content knowledge when they learnt from their colleagues. Moreover, the results also highlighted improvement in their reflective thinking and analytical skills. Because of the challenging tasks during the curriculum development process, teachers became more motivated in their teaching and learning which led to enhance their work performance.

Keywords: teacher learning, curriculum development, professional development, collaboration and communication, reflection

1. Introduction

Learning is not only about transferring ideas from a knowledgeable person to one who is not (Sandholtz, 2002). According to Sandholtz (2002), learning is perceived as a personal, reflective, and transformative process with integration of ideas and experiences and the creation of knowledge. Traditionally, teacher professional development is assumed as teachers listening to lecturers and attending trainings provided by academics. Furthermore, it had been recognized as an activity separated from teachers' daily work (Fullan, 1995).

As time has changed and the demands of society on schools has increased, teachers as passive receivers of knowledge are not enough for the challenges of society. As many scholars have claimed, teachers should be active participants in their own professional growth since they also have rich experiences and knowledge which can be shared by collaborating and communicating with their colleagues and even with other professions (Hargreaves, 1999; Sandholtz, 2002; Shulman, 1986).

2. Theoretical Background

In this section, literature on teacher learning, teacher collaboration and communication for professional development will be discussed. Furthermore, curriculum development as a tool for teachers' professional development will be outlined.

2.1 Curriculum development as an impetus for professional development

Many scholars have pointed out curriculum development as an impetus for improving the professional development of teachers (Fullan & Pomfret, 1977; Keiny, 1993). Some authors have noted that school curriculum is a framework for collective action and individual growth while the school can be considered as an entity or a social organism (Skilbeck, 1998).

According to Keiny (1993), school-based curriculum development (SBCD) can be seen as an endeavor aimed at improving and changing the education system in three areas. First of all, curriculum development at schools can support the school to get more autonomy by reducing dependency on central or national curricula. Secondly, teachers can reflect on their students' needs and then adapt their behaviors to the capacities and abilities of their students through SBCD. The last factor which curriculum development can foster is the professional development of teachers who actively participate in curriculum development by collaborating with colleagues, university professors and different professionals (Keiny, 1993). This article will highlight the growth of the professional knowledge of teachers during the process of new curriculum development in Myanmar.

Teachers' professional development and curriculum development are two couple processes (Keiny, 1993). According to Keiny, teachers gather together in a group to discuss, reflect and learn from each other in the curriculum development process. When they are working in a group, their opinions, experiences, and their knowledge are shared, and they reflect on their own practices while learning from others. Through group working in the curriculum development process, teachers learn from each other and undergo a process of professional growth (Keiny, 1993).

According to Fullan (1991), there are three approaches to curriculum implementation. The first one is "fidelity or programmed approach" where the expectation is that there is consistency between curriculum designers' proposals and what happens as outcomes. The second approach is called "mutual adaptation" where school teachers and principals become decision makers of what is most useful for their schools and students. The third is "evolutionary change" where the practitioners get autonomy to change their practice in order to achieve the desired results (Fullan & Pomfret, 1977). Each approach offers learning opportunities for teachers. As they participate in developing curriculum or delivering curriculum, they reflect on their practices and improve their understanding and knowledge about the subject matter and pedagogical knowledge.

2.2 Collaboration and communication between teachers towards professional knowledge development

In parallel with the need for improving teacher quality, upgrading teachers' professional knowledge has been recognized and favored in education. Since Vygotsky's theory of zones of proximal development and Piaget's theory of cognitive development, our understanding of the nature of teachers' professional knowledge has developed rather slowly (Revai & Guerriero, 2017). Since there was a lack in emphasizing collaboration in teacher education, this led to the slow development in our understanding of teachers' professional knowledge compared to other professions where research and practices are strongly connected during application.

According to Shulman (1987), teacher knowledge can be organized into seven categories. These include:

a) content knowledge,

b) general pedagogical knowledge (broad principles and strategies of classroom management, etc.),

c) curriculum knowledge,

d) pedagogical content knowledge,

e) knowledge of learners and characteristics,

f) knowledge of educational contexts (governance and financing of school districts, etc.),

g) knowledge of educational goals, purposes, values and philosophical and historical grounds (Shulman, 1987).

Among the conceptualizations of knowledge from different disciplines, the distinction between "tacit and explicit knowledge" and "declarative and procedure knowledge" are among the most frequently mentioned ones (Nonaka, 1994). Explicit knowledge is knowledge that teachers can express in words or other symbolic representations to another person while tacit knowledge is what teachers cannot articulate or articulate only with some difficulty. Sometimes, this tacit knowledge is thought of as a personal one which can only be transferred through direct contact with the owner. There is an assumption that the knowledge of teachers is largely tacit, that is, "they know more than what they can tell" (Polányi, 1967). Declarative and procedural knowledge represents "knowing that" and "knowledge how" where declarative is often referred to as "explicit memory" and procedural knowledge as "implicit memory" (Revai & Guerriero, 2017). At this point, to deliver tacit knowledge, collaboration and communication among teachers is extremely important. Many scholars have stressed that since teachers possess knowledge that they cannot articulate, collaboration and communication is the optimal way to disseminate this knowledge within the teacher community.

Besides focusing on teachers' professional knowledge itself, some scholars have highlighted the importance of teachers' professional knowledge in establishing "knowledge-creating schools" (Hargreaves, 1999). According to Hargreaves (1999), teacher professional knowledge is very important in creating such kind of schools and this kind of schools have specific characteristics related with developing teachers' professional development. The features of knowledge creating schools include:

a) auditing the professional working knowledge of teachers,

b) managing the process of creating new professional knowledge,

c) validating the created professional knowledge, and finally,

d) disseminating the created professional knowledge.

This implies that teachers' professional knowledge should be audited, created, validated and disseminated in knowledge-creating schools. Shulman (1987) suggested that the research community collaborate with teachers in order to have access to the practical pedagogical wisdom of teachers. Hargreaves (1999) and Shulman (1987) highlighted that the collaboration among teachers and other professionals assure the knowledge creation and dissemination within teacher communities.

2.3 The specific context: Myanmar

Myanmar, located in Southeast Asia, is the largest country in this region and has a population about 54 million based on the 2014 Census. The education system of the country experienced decline for many decades and it has been at the bottom of the league table of ASEAN since 1962 (Borg et al., 2018). In 2015, the country reemerged from decades of international isolation and started to create reform in every sector of the country. This study investigated one of the reform areas of the country's education system.

With the rapid changes in every sector to achieve sustainable economic development, the country is also focusing on education reform. One of the reforms in education is basic education reforms for the 21st century which include four reform areas:

a) Access, quality, and inclusion

b) Curriculum

c) Student assessment and examinations

d) Teacher education and management

It is assumed that basic education curriculum is an essential building block for the country's socio-economic development and quality education (Ministry of Education, 2015). The Ministry of Education (MOE) focuses on improving the basic education curriculum in order to prepare students for 21st century skills, soft skills (including personal development and employability skills) and higher-order thinking skills. The aims of the basic education curriculum include a number of new items. According to official documents (Ministry of Education, 2015): after the completion of basic education, students will be able to:

1. attend the school until the completion of basic education,

2. develop "union spirit" and appreciate, maintain, and disseminate languages and literatures, cultures, arts and traditional customs of all national groups,

3. become good citizens with well-developed five strengths including critical thinking skills, communication skills and social skills,

4. apply their civic and democratic potentials in daily lives and abide by laws,

5. be competent for Myanmar language which is the official language of the Republic of the Union of Myanmar and develop their skills in their respective ethnic language and English,

6. develop foundational knowledge and skills for higher learning and technical and vocational education,

7. develop sound body and sportsmanship through participation in physical education activities and school health activities, and apply health knowledge in their daily lives,

8. appreciate and maintain natural environment and materialize its sustainability,

9. become global citizens with awareness and appreciation of human diversity and abilities to practice basic knowledge of peace in their daily lives,

10. take pride in being a citizen of the Union of Myanmar.

In parallel to curriculum reforms, MOE tried to strengthen the professional capacity of curriculum development teams. The intention of MOE was to strengthen the professional skills of these teams in order to make them capable to lead the development of the new basic education curriculum and undertaking regular monitoring and reviews. Therefore, MOE implemented the Curriculum Capacity Development Program. Its main components include teacher training on the new basic education curriculum, capacity development of curriculum development teams and capacity development for curriculum development teams of nationalities' languages (Ministry of Education, 2015).

In this research, three groups of high school teachers who participated in curriculum development process at national level and school level were interviewed. The first group includes the teachers who participated in the curriculum development process at the national level. At the national level, teachers collaborated with university professors and academic specialists as members of the curriculum development team. The teachers have the main responsibilities to develop the new curriculum of the specific subject areas. They have worked together with colleagues and professors in adjusting the scope of content to the context and in negotiating new curriculum content according to their specific subjects. The second group includes teachers who were trained by curriculum developer teachers and then were assigned as trainers to share and teach the new curriculum content with colleagues. Teachers were trained by university professors and academic specialists for two days. After two days of training, they have been appointed as trainers to deliver the new curriculum related knowledge to their colleagues in the township where their schools are located. The third group are teachers who attended those trainings (delivered by trainer teachers for seven days) in the process of curriculum development.

3. Methodology

In order to comprehensively understand the teachers' learning and collaboration during the process of curriculum development and implementation, this research applied a qualitative study through individual interviews with participants. The main method of data collection was semi-structured interviews with six school teachers.

3.1 Participants

The selection of interviewees followed two main rules: firstly, selected interviewees had to be representative of basic education teachers in the curriculum processes within the country. Secondly, it is a random selection from three categories of curriculum processes:

1. teachers who participated in developing curriculum at national level (curriculum developer teacher),

2. teachers who were trained by curriculum developers and were appointed as trainers to deliver the new curriculum to their colleagues at school level (trainer teacher), and

3. teachers who received trainings from curriculum delivery teachers (trainee teacher).

The six interviewees include two high school teachers who participated as curriculum developers collaborating with university scholars and curriculum specialists, two high school teachers who delivered the new curriculum to their colleague teachers and two high school teachers who received trainings from trainer teachers (see TABLE 1).

TABLE 1. INTERVIEWEES BY CATEGORIES

Interviewee	Role in curriculum development process	Number
High school teacher	Curriculum developer teacher	2
High school teacher	Trainer teacher	2
High school teacher	Trainee teacher	2

Source: own editing

3.2 Procedures and Data analysis

An interview guide and protocol were developed based on the literature review on teacher professional growth in the curriculum development process through collaboration (Johnson, 2000; Goodnough, 2004; Gu & Wang, 2006; Shawer, 2017; Lwin, 2019). Interview questions were also structured based on careful reading and analysis of literature on curriculum development and teachers' professional growth (Johnson, 2000; Goodnough, 2004; Gu & Wang, 2006; Shawer, 2017; Lwin, 2019). All the interviews were recorded and transcribed. All the recordings had been deleted after the transcription was done. Interview data were analyzed through coding.

The codebook was created by the researcher before starting the coding process based on the thorough analysis and coding of one document. The codebook was added and left open for further coding process. In order to increase trustworthiness in data analysis, documents were coded at least two times by the researcher at different times.

4. Findings

The findings can be presented in three parts. These three parts are presented as areas of teachers' professional development in teaching and learning. According to interview results, skill development and knowledge development are the main domains where teachers significantly improved in their practices. The third area includes the motivation and work performance of teachers.

4.1 The skills domain

4.1.1 *Reflective thinking and practice*

According to the interview results, high school teachers who participated in curriculum development, improved their reflective thinking skills. Teachers reflected on their own practices to develop the content of the specific subject matter. They felt that they had improved

in their knowledge and in their pedagogical understanding of the content compared to their prior knowledge before they participated in the curriculum process. The teacher who was responsible for Grade 7 and Grade 8 mathematics curriculum development claimed that she was scared at the beginning of the process and only focused on "work done". As she had no experiences with developing curriculum, she could not focus on connections between concepts and content of mathematics across the grades. She reflected on her previous understanding of the curriculum development and the present time, and she found that she missed some important points in developing curriculum. She reflected to her experiences on developing Grade 7 curriculum compared to her present experiences in developing Grade 8 curriculum. She realized that she learnt from her experiences and apply her new knowledge in new situation.

> *"First of all, I will say that I am satisfied what I have done. There was a great improvement in me. For example, there is a difference in me between Grade 7 curriculum development and Grade 8. I became to know a lot of things that I didn't know before. When I started Grade 7 curriculum development, I mainly focused on "work done"; work done of having a new curriculum. I was so scared. I felt like I was working on a project in my bachelor studies. I only concentrated to finish it and to work it quickly. I didn't really focus on mathematics concept and their connection and didn't realize how to connect them with the future content. For example, in Grade 7 curriculum, we have to include teaching about triangles. So, altitudes and medians; these concepts are important to learn "triangles". I never thought to check what was included in the previous grade (curriculum) concerning these concepts. I never asked my colleagues who were responsible for this chapter in the previous grade. But this ignorance of mine changed when I started developing Grade 8 curriculum. As I developed Grade 8 curriculum, I checked both the previous grade 7 content and upcoming grade 9 content. I analyzed what was the point of giving these concepts in Grade 7 and what was in Grade 8. I make the connection between these concepts across the grades to make the children to understand these concepts easily based on what they have learnt in the previous grade." (curriculum developer teacher 1)*

For the other teacher who was responsible for science curriculum development, he came to understand that he did not know a lot of subject matter information before he started participating as a curriculum developer.

> *"I thought that I knew quite a lot about my subject and all my understanding is correct. But if I compared myself to previous me, I realized that I knew very little and I learnt a lot more than before. I came to realize that some content or concepts I understood wasn't correct. I learnt them from professors and subject specialists." (curriculum developer teacher 2)*

In the case of teachers (trainer teachers) who delivered new curriculum content to colleagues, they reflected on their teaching methods and approaches according to the situations they encountered. At first, they tried to lecture about the new topics of the subject. Then they realized that the situation was out of control when they lectured to teachers and did not give a chance to discuss and participate. One of the reasons they changed the lecture to discussion form of training was based on their reflection of the situation and teachers' knowledge. They were aware of the knowledge they possessed and did not try to dominate the whole training.

"As we have been trained by university professors only 50 minutes for the new topics and content, we didn't have that strong academic knowledge. At first, we tried to do the lectures and trainings, but later, we realized that discussion and collaborative form of training was more effective that lectures and trainings. We discussed together with trainee teachers and then we learnt together." (Trainer teacher 1)

In case of trainee teachers, they realized that their prior knowledge was not enough to teach new curriculum content to students. Not only they realized that the future task would be very challenging for them but also they were aware of their existing knowledge and of polishing their skills and knowledge about the new curriculum content.

"The new curriculum content of my subject is so advance and difficult for me. It will be very challenging task to deliver it to students. I have to be rich in subject knowledge before I deliver it to my students. My usual teaching methods are not enough to teach the new content anymore. I need to invent and try new teaching approaches for it." (Trainee teacher 1)

4.1.2 Collaboration and communication

One of the factors that foster teacher learning for professional development is collaboration and communication. Teachers learn mostly when they cross their boundaries and try to communicate with colleagues and other professionals. Teachers know more than what they can tell (Revai & Guerriero, 2017). They have a lot of tacit knowledge and these elements of tacit knowledge can be drawn out and shared to others by collaboration and communication with their colleagues.

According to interview results, teachers got the chance of collaboration and communication with their colleagues by participating in the curriculum development process. One curriculum developer teacher mentioned that he got the chance to collaborate with others which he couldn't do intensively in his daily teacher's life.

"I made a lot of discussion with my colleagues who were developing curriculum on another chapter or topics. We discussed with each other when we had dilemmas and were not sure about the concepts and ideas. For example, we always compared and checked between the old curriculum and the scope of new curriculum. Old curriculum focus more on using logarithms and etc. But the new curriculum didn't focus on it. So we discussed about it to change learning objectives, teaching methods and important ideas. This kind of collaboration could not happen in a teacher's daily life. Now, we got a real intensive communication with each other." (curriculum developer teacher 2)

Another curriculum developer claimed that she learnt a lot from academic professors and specialists during the curriculum development process through collaboration. There occurred difficulties during the collaboration process, but she tried to cope with the situation and ultimately she learnt from it.

"In Grade 8, the professors wanted to give more concepts, more content and ideas to students. But for us, we wanted to do more activities. The reason behind is that they are mostly from academia, so they are experts in subject matter and wanted to focus more on ideas and content of the new curriculum. But for teachers, like us, we wanted to create learning environments as more joyful and exciting place. We had to adjust between us and professors. We included what we want, and not to exclude what they wanted. So, the negotiation was really working here. Sometimes, I felt like I am

defending my thesis with my supervisors. We argued and discussed a lot. But I like the experiences. We couldn't get this opportunity to discuss with professors without participating in this process." (curriculum developer teacher 1)

Collaboration and communication was also intensive when trainer teachers delivered knowledge about the new curriculum to their colleagues. During the training, they collaborated with their colleagues whom they never communicated with before. They found that all teachers have their unique abilities and teaching methods.

"All teachers are amazing. They know how to give the practical knowledge to students. How to connect the theory and practice of the subject knowledge? There are some topics in my subject that I don't understand really well. But when the teachers did micro teaching, I felt that I understood the concept completely." (Trainer teacher 1)

"We called it as training, but it was more like discussion. There was very intensive collaboration between teachers. We prepared the lesson together and found solution if we all did not know the new topics and concepts. So all the teachers read a lot or asked their teachers (university professors). Some learnt from private tutoring books and in the next day, we discuss together about unsolved problem; In this way we got the solution." (Trainer teacher 2)

One of the trainee teachers mentioned that she needed to guide her colleagues as she is a head of English subject department at her school. She searched teaching aids and approaches to motivate and help her colleague teachers who have difficulties in understanding some contents of the new curriculum.

"I searched songs, phonetic apps and videos to share for my teachers. Then I made a gathering before the teaching. We discussed and practiced before we teach." (Trainee teacher 2)

For another teacher trainee, she had a chance to meet all the teachers in the township where their schools are located.

"I got a chance to meet all the teachers who are working in different schools of the same township. Some of them, I have met before. But through this curriculum training, I met all teachers in the same township including private teachers." (Trainee teacher 1)

4.2 The knowledge domain

Another factor that the findings highlight was the professional development of teachers in subject matter knowledge. Through collaboration with university professors and academic specialists, teachers gained ideas and knowledge about the specific subject they teach at schools. One curriculum developer teacher mentioned that she learnt a lot from professors as they gave explanations and corrected the teachers when they misunderstood some concepts in the subject matter.

"Another thing is that the knowledge what I learnt from university subject specialists and retired professors. As a high school teacher, we are not so much strong enough in subject matter knowledge. Some concepts we understand are not true or valid. At that time, we got the new knowledge from professors and specialists. Whatever we proposed are revised and corrected by professors and specialists. For example, there are some

mathematics terms like "quartile" and we don't know how to translate it into Myanmar language. Then, the professors and specialists discussed with each other and with us, then we made the translation and definition. Sometimes, we misunderstand the concept, then they explained and corrected. Some of my friends had to re-develop/write the whole curriculum content because the professors pointed and explained that her work was not valid or needed to be improved. We learned a lot from them." (Curriculum developer teacher 1)

For teacher trainers, they were trained two days by university professors. One trainer teacher stressed how much she learnt about the specific subject knowledge when she collaborated with her colleagues. When she was trained by university professors, it was only two days and the lecture for specific subject content was only 50 minutes. Related to subject matter knowledge, she learnt a lot from her colleagues whom she gave training to for seven days.

"Compared to the training I got and training that I gave, I got academic knowledge more from the training I gave when I was a trainer. The reason is that we got only 50 minutes training about new subject matter from academic professors. The training was two days in total, yes, but only 50 minutes was related to new content. When I gave training to school teachers, it was seven days. But we discussed and worked a lot and did micro teaching together with colleagues. Then it was very rich experiences as we discussed together, so we learn a lot." (Trainer teacher 1)

"There was one trainer teacher who has been teaching this subject for more than 25 years. She got her master degree in the subject. So, she is an expert in the subject. I was so scared to give training to colleagues. We have new concepts and two new chapters in this new curriculum. I was so stressed and afraid to give lectures because I didn't have enough knowledge in this new subject area. Fortunately, the experienced teacher said that she will take responsibility for these new chapters. And she did it. When I was listening to her lectures, I felt like I understood these concepts completely and became confident. I gained a lot of subject content knowledge from her." (Trainer teacher 2)

This also happened with trainer teacher 1. The trainer teachers got only two days training and they felt that they were not qualified enough to give lecturers to their colleague teachers. However, with the help of experienced teachers, they did the trainings successfully and effectively.

"And there was one teacher who is very experienced in the subject. She has been teaching this subject for 20 years or more. She is an expert in the subject matter. And she did micro teaching, and she explained very well and I can feel that the pupil will like her so much. She is an expert teacher and can explain very well what she understands, and she knows. I am a trainer, but I learnt a lot from her. She can connect the lesson and how to teach it according to ITPR. This ITPR is what we got from training; which means that you have to teach lessons through the following "ITPR"; introduction first, then teaching, and then practice and review. She taught lesson perfectly according to that procedures and it was amazing. She can connect the lesson with the practical things very well." (Trainer teacher 1)

Besides the subject matter knowledge, the interview results showed that teachers learnt pedagogical content knowledge through the trainings they got and the trainings they gave to

their colleague teachers. For the curriculum developer teachers, they have participated in several trainings by consultants. They worked together with international consultants and academic professors. In the trainings given by consultants, they learnt how to approach a lesson to achieve the objectives and educational theories related to teaching and learning.

> *"In the training, they gave the lecturers on Bloom's Taxonomy. I have already learned in my bachelor of education. But when I learnt this again together with my colleagues and other professors in the curriculum development process, I understand more about it." (curriculum developer teacher 1)*

For the trainer teachers, they learnt new teaching approaches and educational standard from the training.

> *"Total training days by professors is two days. Academic professors and methodology professors gave lectures to us. First day of training is for all subject teachers in general, introducing "ITPR" and 5 C. "ITPR" is how to approach a lesson according to introduction (I), teaching (T), practice (P), review (R) and 21st century skills. I didn't know about ITPR before that. We just know it now. So, the main concept of training is to use ITPR in every lesson. Usually we listen to the training, after the training, we had questions and answers section." (Trainer teacher 1)*

> *"There was two parts in the training. First one is the general lectures about how to approach a lesson and how to teach. The second part is lectures about specific subject content." (Trainer teacher 2)*

For the trainee teachers, they also learnt pedagogical content knowledge from their colleagues. One of them learnt several different ways to solve one problem in her specific subject.

> *"During training, we did in a collaborative way. For example, we were divided into the groups. There were private teachers group, government teachers group, novice teachers group, etc. In mathematics, there are several ways to solve a problem. When private teachers group proposed one method to solve a problem, government teachers discussed it in alternative way. And so on, we discussed a lot. It was a group discussion. Through those group discussion, we leant several different ways to solve a problem which we didn't know before." (Trainee teacher 2)*

4.3 Motivation and work performance

The interview findings showed that the teachers improved their motivation and work performance during developing and implementing curriculum. One curriculum developer teacher noted that she became a more responsible and reliable person. She can manage the time and workload better than prior to her participation in the curriculum development process.

> *"Another thing is that I learned responsibility and accountability. And how to manage workload and how to do work precisely and systematically. I have full responsibility for what I am doing in this curriculum process and I became more responsible person than before." (Curriculum developer teacher 1)*

For school teachers who gave trainings to their colleagues, they became more motivated in their teaching and learning. The task was challenging and this led them to read more, and do some research on the subject matter before they taught it.

"It is a mixture of public and private school teachers when we gave training. I saw that there was always competing situation between two groups. And it was very challenging for me. For example, there was one teacher who asked a lot of questions about the content and ideas. So, to answer their questions and to lead discussion, I need to read a lot and prepare a lot before giving training to them. This was not an easy job but I am satisfied that I tried hard and learnt a lot from it." (Trainer teacher 2)

According to trainer teacher 2, the active participants and challenging situations forced them to read and study a lot in order to give the training and face the difficulties. Not only were they motivated by the participants' discussions, but also their work performance improved as they tried hard to handle the various situations.

5. Discussion

Keiny (1993) mentioned that teachers' professional development and curriculum development are two couple processes. This study proved that teachers developed their professional knowledge by participating in curriculum processes. The teachers' knowledge improvement in this study can be presented according to Cochran-Smith's three conceptions of teacher knowledge.

Cochran-Smith (1999) distinguished three conceptions of teacher knowledge to understand the relationship between knowledge and practice:

1. knowledge for practice,
2. knowledge in practice, and
3. knowledge of practice.

In this study, teachers experienced all this knowledge through participating in the curriculum development process. Knowledge-for-practice is referred to formal knowledge and theory that teachers can use in order to improve their practice (Cochran-Smith & Lytle, 1999). In the curriculum development process, curriculum developer teachers discussed with academics for the subject matter content, and this led to improve in their knowledge-for-practice. In the case of trainer teachers and trainee teachers, learning and teaching new curriculum content led them to improve the specific subject content and how-to-teach their subject. All three groups of teachers gained "knowledge-for-practice" through trainings and discussion during curriculum development.

Regarding knowledge-in-practice, which is practical knowledge, teachers learnt and observed this knowledge from their experienced teachers who are expert in the subject matter (Cochran-Smith & Lytle, 1999). For knowledge-of-practice component, teachers need to investigate their own classrooms and school sites as well as from their colleagues' teaching practices. Then, they need to construct and connect these observations and learning to their practices (Cochran-Smith & Lytle, 1999). In the curriculum development processes, teachers did investigation on their own practices and observed their colleagues' teaching. From this, they built their own knowledge-of-practice to apply in their situation.

One of the important elements that can foster the optimal professional development of teachers is "reflection". This study explored teachers' professional development through curriculum development processes. It is obvious that teachers showed significant improvement in their professional development in their subject matter knowledge, pedagogical content knowledge

and pedagogical knowledge. All of these improvements were resulted from teachers' reflection on their practices and also reflection on their colleagues' practices. They learnt from reflection through collaboration and communication.

5.1 Beyond professional development: knowledge creation

According to Hargreaves (1999), teachers' professional knowledge should be audited, created, validated and disseminated in knowledge-creating schools. This research did not focus on school-based curriculum development, but on teachers' collaboration in the curriculum development processes. However, this research context can be discussed and reflected on the basis of Hargreaves' characteristics of knowledge creation in school. All groups of teachers participated in knowledge validation, creation and dissemination stages during the curriculum development processes.

During the curriculum development process, teachers collaborated and communicated with their colleagues, university professors and academic specialists. Throughout the process, they constructed new knowledge by rebuilding their concepts which they might have misunderstood and conducted reflections on their practices. As one of the curriculum developer teachers mentioned, the prior knowledge he had proved to be not valid and with the help of specialists and professors, he has built new understanding of the concept and validated his knowledge.

> *"Some concepts we understand are not true or valid. At that time, we get the new knowledge from professors and specialists."*

This showed that the collaboration with colleague teachers and professors changed the existing invalid knowledge of teachers to validated knowledge. Through these processes of discussion and collaboration, teachers have created their new knowledge and understanding on specific subject matters.

According to Gu and Wang (2006), professional learning and development of teachers can be obtained through enhancing their collaborative learning and giving opportunities to utilize their analytical skills on their practices. This study showed that the participating in curriculum development process is the key to teachers' professional learning and development as it fosters teachers' collaborative learning and utilize their analytical skills on practices.

Professional development is obvious in teachers' reflective thinking and practice skills as well as in subject matter knowledge and pedagogical content knowledge. Curriculum developers reflected more on the connection among the subject content. They tried to reflect on their previous work done and learnt from it. They realized that they had weaknesses during the first experiences of developing curriculum. Curriculum developer teacher 1 said that:

> *"first time, I only concentrated to finish it. I didn't really focus on mathematics concept and didn't realize how to connect them with the future content."*

They only concentrated on work to be done but not on the connection among the concepts and ideas in mathematics curriculum. They were worried and anxious of work not being done. Nevertheless, they reflected on their past experiences and analyzed the situation. Finally, they learnt from past experiences and produced better work in the next procedures.

All teachers showed "professional development" in subject matter knowledge. Curriculum developers learnt subject matter knowledge in collaboration with university professors and

academic specialists. In the case of school teachers, they learnt subject matter knowledge as well as pedagogical content knowledge through discussion, group work, micro teaching, and collaboration with their colleagues.

During the curriculum development processes, there is no doubt that creation and dissemination of knowledge occurs constantly. Teachers collaborated together in order to learn new curriculum content in their specific subject matter. This creates the opportunity for teachers share their tacit experiences and knowledge through group discussion and communication. Furthermore, teachers also practiced micro teaching. Tacit knowledge of teachers was transmitted through micro teaching and group discussion. One school teacher stated that she was amazed by the way her colleague teacher was doing micro teaching. And she learnt a lot from the teacher. This proved that they disseminated their tacit knowledge which they couldn't articulate with the help of micro practice teaching.

6. Conclusion

Teacher participation in curriculum development has been recognized as an opportunity for teachers' professional development and knowledge creation (Keiny, 1993). Participation in curriculum development makes teachers reflect on their practices, analyze experiences, and create new knowledge. Collaboration and communication are essential for sharing practices and creating new knowledge in developing curriculum content. It is obvious that teachers become active participants in developing professional knowledge through participating in curriculum development.

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Beliefs and Attitudes that Influence Learning: A Mind, Brain, and Education Literature Review

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Abstract

Mind, Brain, and Education (MBE) is a transdisciplinary area that joins neuroscience, psychology, and education to inform teaching practices and educational policy with research that can be translated into applicable and reflective tenets and principles of how students learn more effectively. It is well established in the MBE literature that what leads students to success are not only cognitive abilities but also beliefs and attitudes towards learning, which forms a complex and multifaceted universe with different levels of influence. This study has conducted a literature review on the contributions of MBE concerning these beliefs and attitudes and attempted to summarise them into a useful guide that might help students reflect on their academic achievement throughout life. Four essential elements were analysed and discussed, namely: growth mindset, metacognition, self-efficacy, and neuroplasticity. It is argued that these concepts are of paramount importance to anyone who wishes to accomplish both academic and career goals and they are aligned with the notion of lifelong learning.

Keywords: academic achievement, growth mindset, metacognition, self-efficacy, neuroplasticity

1. Introduction

Much is debated about how students learn and intelligence seems to be the basis and most reliable predictor of how much they can learn. For years, educators and psychologists have tried to measure intelligence to make assumptions about how successful students would be in any type of learning environment. The most influential work was done by Alfred Binet and Theodore Simon (Binet & Simon, 1916, Terman & Merrill, 1937) with the development of a scale that was later adopted by several institutions to assess students' Intelligence Quotient (IQ). Despite Binet's apprehension and diverging opinion with Simon about the reliability of their own tool to measure intelligence, it became a widespread psychometric test in different arenas and levels of modern society, including school, mental institution admissions, psychological and educational research, a criterion for scholarships, and the like.

This is perhaps what led parents, school managers, and society in general towards the belief that children were born with a fixed intelligence quotient that could not be further developed throughout their lives. IQ testing became the norm in the following years because it was available and supported by research. Nonetheless, the advancement in psychological theories, associated with breakthroughs from cognitive neuroscience gave rise to new ways of looking at intelligence and what leads to long-term learning and success (Dweck, 2007). Non-cognitive skills, that is, those relating to behaviours, feelings, attitudes, and beliefs, have shown to influence school outcomes (Farrington et al., 2012; Duckworth & Yeager, 2015).
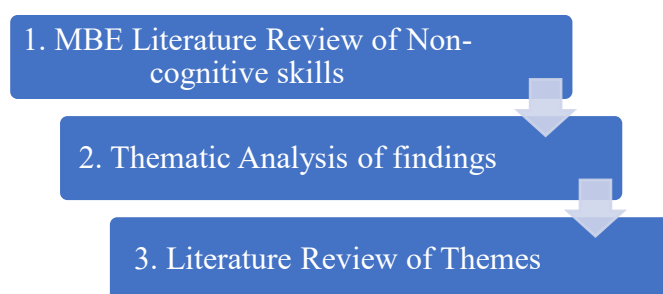
The birth of a new science that joined these new developments in psychology, neuroscience, and education together, namely, Mind, Brain, and Education (MBE), has given educators and policymakers the resources to understand learning more holistically and from an evidence-informed perspective (Tokuhama-Espinosa, 2014). One of the objectives of MBE, thus, is the fight against the dissemination of <u>neuromyths</u> as they can potentially hinder students' learning outcomes by misinforming teachers on effective classroom practices (Fischer, 2009; Dekker et al., 2012; Tokuhama-Espinosa, 2014). Its transdisciplinary character gives MBE a more holistic approach and assumes that no parent field alone should be prioritised over the other two.

This study has conducted an exploratory search in the MBE literature and, through a subsequent thematic analysis, has identified four non-cognitive skills that fall under the umbrella of beliefs and attitudes: *growth mindset*, *metacognition*, *self-efficacy,* and *neuroplasticity*. This review suggests that interventions based on these four concepts can potentially achieve positive results regarding students' academic performance and career goals. As indicated below, research seems to corroborate the effectiveness of beliefs and attitudes-based interventions when contrasted with interventions which are only concerned with cognitive tests such as IQ. Each of the concepts is discussed ahead, and it is argued that successful learning design, planning and delivering, should shift their focus onto building students' character based on these beliefs and attitudes and on the idea of lifelong learning.

2. Methodology

This was an exploratory study (Creswell, 2003) as it intended to search for the contributions of MBE authors regarding non-cognitive skills that affect learning outcomes. The search was conducted in three stages:

FIGURE 1. STAGES OF THE STUDY

1. MBE Literature Review of Non-cognitive skills

2. Thematic Analysis of findings

3. Literature Review of Themes

Source: own compilation

2.1 MBE Literature Review

First a literature review was done in order to identify authors who had published studies about non-cognitive skills based on brain and mind research. I identified two books, regarded as major references in the area, that covered 97 influences on academic achievement. They were:

TABLE 1. CHOSEN MBE LITERATURE AND NUMBER OF INFLUENCES ON ACHIEVEMENT

Book	Author	Number of influences
Making classrooms better: 50 practical applications of Mind, Brain, and Education science	Tokuhama-Espinosa (2014)	50
Visible Learning for teachers: Maximizing Impact on Learning	Hattie (2012)	47*

* Hattie (2012) covers 150 influences on academic achievement. However, I decided to use 47 only based on Tokuhama-Espinosa's suggestion in her book (2014) as they are more directly related to the classroom environment.

Source: own compilation based on MBE literature review

Secondly, after selecting the authors, a thematic analysis (TA) was conducted. According to Braun and Clarke (2006, p. 76), "Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data". It is a type of qualitative method approach that allows the researcher to find common categories and group them to check for trends. Under the scrutiny of a TA, several apparently distinct items, concepts, or, in this case, strategies/practices, can be summarised into lists and allow for grouping (Matthews & Ross, 2010).

2.2 Thematic Analysis

Braun and Clarke (2006) recommend a six-phase framework for conducting a TA:

a) familiarise oneself with the data

b) generate initial codes

c) search for themes

d) review themes

e) define themes

f) write up

After familiarising myself with the data, I used their suggested influences as the codes. These influences were entered into tables (see Appendix I) to facilitate theme search. Non-cognitive skills were highlighted in blue and a new table was built based on the chosen codes as shown in Table 2:

TABLE 2. INFLUENCES ON ACHIEVEMENT ACCORDING TO MBE AUTHORS

Tokuhama-Espinosa (2014)	Hattie (2012)
14. Believe in the role of plasticity and in your students	1. Self-reported grades, self-expectations, self-efficacy
15. Foster metacognition and mindfulness	3. Response to intervention (attitude)
19. Reinforce effort and provide recognition	13. Metacognitive practices
21. Prepare students to set personal objectives and give themselves feedback	15. Classroom behaviour
32. Improve student self-efficacy	16. Self-verbalization and self-questioning
37. Award perseverance and celebrate error	17. Study skills
39. Never work harder than your students	20. Not labelling students
	37. Concentration, persistence, engagement
	41. Self-concept

Item numbers were kept as the original and columns were coded in different colours to facilitate the identification of authors

Source: own compilation based on MBE literature review

The next step was to group these 16 items into themes. Farrington et al. (2012) discuss how non-cognitive skills are highly associated with concepts such as *self-discipline*, *metacognitive strategies*, *academic mindsets,* and *behaviours*. I used these broader concepts as a reference and checked if the codes in Table 2 would fit them.

Similar codes were grouped together as indicated below:

TABLE 3. THEME SEARCH OF INFLUENCES ON ACHIEVEMENT

21. Prepare students to set personal objectives and give themselves feedback 32. Improve student self-efficacy 1. Self-reported grades, self-expectations, self-efficacy	Theme 1
15. Foster metacognition and mindfulness 13. Metacognitive practices 17. Study skills	Theme 2
19. Reinforce effort and provide recognition 37. Award perseverance and celebrate error	Theme 3

39. Never work harder than your students 20. Not labelling students 37. Concentration, persistence, engagement	
14. Believe in the role of plasticity and in your students*	Theme 4

*Items highlighted in grey are proposed by Tokuhama-Espinosa (2014), the ones without any highlight are proposed by Hattie (2012). Codes 3 (Response to intervention (attitude), 15 (Classroom behaviour), 16 (Self-verbalization and self-questioning), and 41 (Self-concept) proposed by Hattie (2012) were left out as: a) they did not fit well with any other theme; and b) they did not form a theme of their own as they were quite different.

Source: own compilation after thematic analysis

After considering the keywords and definitions, four themes emerged from grouping the codes. The first one emphasised students' self-efficacy. The second theme was aligned with the concept of metacognition. The third one fit with the definition of growth mindset. The fourth theme was about neuroplasticity.

The third stage of this study consisted of a literature review of the proposed themes to be aligned with Braun and Clarke (2006)'s three last steps: *review themes*, *define themes*, and *write up*.

2.3 Literature Review of Generated Themes

2.1.1 Self-Efficacy

The first belief and attitude is Bandura's idea of self-efficacy. He discussed in his work that self-efficacy relates to a person's ability to successfully cope with the demands of setting, keeping, and achieving goals. It involves prioritising, organising, planning, executing, and assessing tasks to make sure that performance is the closest as possible to what can be considered a successful outcome (Bandura, 1997).

Since self-efficacy is a broad concept and specific to different domains, which means a person can be self-efficacious in one area and not in another, this article will work with the concept of Academic Self-Efficacy (ASE) (Zimmerman, 2000). It relates to having the necessary mindsets and skills to perform well in school. It is connected with the beliefs and ability to carry out one's assignments, organise time to study, and get good marks in an educational setting for instance. The literature indicates that ASE is a strong predictor of positive school outcomes (Linnenbrink & Pintrich, 2002; Zajacova et al., 2005; Schunk et al., 2008; Usher & Pajares, 2008; Ferla, Martin, & Yonghong, 2009; Mann et al. 2014).

Bandura (1982, 2000) offers four sources of self-efficacy, namely, *enactive mastery*, *vicarious experiences*, *verbal persuasion*, and *arousal*. The first relates to the agent's own successful experience on a task as the most important way to increase self-efficacy. The second is linked to observing other people successfully accomplish a task and gaining the confidence to perform it too. Source number three claims that encouragement can be given orally by both the agent of a task and by others to accomplish it. Finally, the last one refers to the emotional state of the agent, particularly interest and excitement, and its impact on performance (Bandura, 1982; 2000).

In a meta-analysis, Richard, Abraham, and Bond (2012) found that higher self-efficacy scores are highly correlated with higher GPA scores in college. Other studies have demonstrated that

interventions based on ASE yield positive learning outcomes (Colquitt et al., 2000, Mathisen & Bronnick, 2009, Sitzmann & Ely, 2011).

2.1.2 Metacognition

The term originated in the works of American psychologist John Flavell (1979). He describes metacognitive people as those who are aware of their own cognitive processes and have the capacity to control, plan, monitor, regulate, and reflect on their ability to learn. Metacognition relates to "thinking about thinking" or "learning how to learn" (Zulkiply, 2009). Its basic premise is that students' should learn non-cognitive skills that relate to more effective learning strategies so that they may be able to overcome difficulties (Hacker et al., 2009). Different studies have also shown a positive correlation between using metacognitive practices, that is, having students think about the best way to learn and adopt certain habits, and academic achievement (Akama, 2006; Hacker et al., 2009; Karpicke et al., 2009; Dunlosky et al., 2013; Gutman & Schoon, 2013; Callan et al., 2016).

Metacognition is generally divided into two dimensions (Flavell, 1979; Brown, 1987):

1. Metacognitive Knowledge;
2. Metacognitive Regulation;

The first refers to people's knowledge about learning, their own abilities, and the experiences or strategies that can help them achieve a learning goal. The second one is about how well they can control their learning progress by planning, executing, monitoring, and making adjustments if need be.

This normally involves four stages:

1. planning;
2. monitoring;
3. evaluating; and
4. reflecting (Flavell, 1979; Brown, 1987).

Zulkiply (2009) and an OECD report (Zemira & Bracha, 2014) suggest that metacognitive students may compensate for cognitive disadvantages as they become more reflexive about their own learning process. They are better able to predict their scores, which are higher than students who are not as metacognitive, and they are also more efficient learners who can problem-solve and find more adequate strategies and solutions to their study challenges. These students can organise themselves to achieve their goals and adapt their strategies when necessary, which is related to the concept of self-efficacy.

2.1.3 Growth Mindset

In the 1980s, Gardner's (1983) idea of multiple intelligences and the new discussion of implicit theories about the intellect (Sternberg, 1985; Dweck & Leggett, 1988) put the notion of a fixed intellect, mostly related to academic abilities, in check. It is important to contrast that implicit theories refer to the internalised assumptions that teachers, students, parents, and society, in general, have about intelligence and creativity, as opposed to explicit theories, which are externalised by the scientific community through the scientific method (Dweck & Leggett, 1988). These developments laid the foundation for Yaeger and Dweck's (2012) fixed versus growth mindset duality by proposing that there were two types of mindsets about intelligence:

1. entity (fixed): the belief that intelligence is fixed and immutable; and

2. incremental (growth): the belief that intelligence is fluid and can be increased (Sternberg 1985, Dweck & Leggett, 1988).

These new theories have become quite popular globally and are used in lectures, teacher training programs, and educational interventions. However, despite the shift from the concept of a more fixed type of intelligence to a more fluid one, the prior remained important in the scientific literature with new studies emerging claiming that IQ might still be the best predictor of academic (Gagné & St. Pere, 2001) and professional success (Schmidt & Hunter, 2004). Another study by Cury et al. (2008) suggests that having a more fixed (entity) mindset may prevent students from engaging in habitual practice (homework), which, in turn, might explain why scores are lower for these students.

In spite of the aforementioned studies, interventions based on the concept of growth mindset have in general produced positive results. Several studies' interventions basically consisted of lessons that were meant to raise students' awareness of their implicit theories and the concept of growth mindset versus a control group that either received lessons about other topics or simply some materials but no lesson (Aronson et al., 2002; Blackwell et al., 2007; Paunesku et al., 2012; Yeager et al., 2013; Paunesku et al., 2015; Hochanadel et al., 2015). These studies were carried out in different settings with different age groups and subject areas and varying sample sizes. Overall, the studies suggest that interventions based on the concept of growth mindset have shown to be effective in improving students' academic outcomes.

Aronson et al. (2002) verified significant race and condition effects on the outcomes when matching Black (African American) and White students. On average, Black students had a lower SAT score and the intervention had a more visible impact on them when compared to Whites, which might suggest that students who come from a more socially vulnerable background already have a growth mindset and may benefit more from the intervention. On the long term, Blacks maintained the idea that we have a more "malleable intelligence" more than Whites and had better achievement scores. The only study that presented evidence of a weak correlation between a growth mindset intervention and improved academic achievement was the one by Mills & Mills (2018), which did not find a statistically significant correlation between mindset and retention, and between high mindset scores and enrollment for the next semester.

The fact that there are only a few studies (see Mills & Mills, 2018) suggesting that mindsets are not a good predictor of academic success may suggest that incremental interventions are a reliable way to help schools achieve higher performance. The Education Endowment Foundation suggests, in its 2017 report (Higgins et al., 2016), that metacognitive skills and growth mindset interventions are effective ways to promote higher academic achievement.

2.1.4   Neuroplasticity

Finally, the last concept is *neuroplasticity* or *brain plasticity*. This development of cognitive neuroscience posits that the brain has the ability to change its structure when learning occurs (Berlucchi & Buchtel, 2009). That means that the brain can not only create new synapses, but it can also eliminate ones which are not frequently used and change pre-existing ones. This property is directly related to one's ability to learn, self-correct, and improve skills (Kania, Wrońska, & Zięba, 2017). Therefore, students who are made aware of this property of the brain

will likely become more successful learners in the classroom and, consequently, achieve better outcomes (Blackwell et al., 2007; Paunesku et al. 2015 Myers et al., 2016).

Blackwell et al. (2007) have found that an intervention based on neuroplasticity was able to increase at-risk 7th graders' motivation and had a positive influence on their maths marks. On the other hand, it is worth mentioning that Paunesku et al. (2015) tested nearly 800 students (aged 14 to 18yo) who were divided into two groups and received a 45-minute session each (one on how neuroplasticity positively impacts achievement, and the other on general neurobiology) and found no statistically significant differences between the groups (although the control group had lower marks).

A meta-analysis of 10 peer-reviewed articles conducted by Sarrasin et al. (2018) suggests that teaching the notion of neuroplasticity leads to significant gains in motivation, brain activity, and ultimately to the development of a growth mindset. The study concludes that interventions based on the concept of neuroplasticity can generally have a positive impact on academic achievement and that inconsistent findings may have something to do with the length of the intervention, the type of task or subject analysed, and whether students are at-risk or not.

3. Conclusion

This article has attempted to elucidate some theories and empirical evidence related to how students can learn more effectively which are not directly under the umbrella of their cognitive abilities. First, a literature review within the MBE area was conducted. Two major references with 97 influences on academic achievement were found and coded. These 97 codes went through a thematic analysis and were narrowed down to 16 codes which were related to non-cognitive skills within the domain of beliefs and attitudes. Then I conducted a theme search by grouping these 16 codes according to similarities. Four themes emerged (*self-efficacy, metacognition, growth mindset,* and *neuroplasticity*) and four codes were discarded because they did not fit. Finally, another review was done focusing on the generated themes.

These attitudes and beliefs about learning and intelligence seem to be strongly interconnected and give support to the results of successful interventions based on the concept of malleable intelligence. A possible illustration of this link would be a student who understands that the brain is always capable of change and will more likely have a more positive relationship toward learning and effort. In that sense, this student might be more open to metacognitive strategies taught by the teacher and understand the value of self-organised study and goal-setting, which means this student would be potentially more self-efficacious and display more of a growth mindset in the classroom.

This study has looked at how implicit theories of intelligence, particularly the dichotomy between growth (incremental) mindset and fixed (entity) mindset, impact academic achievement. The literature suggests that there is a strong and positive correlation between attitudes and beliefs toward intelligence and learning. Only one study has been able to challenge the previous findings that a growth mindset is strongly correlated with academic performance (see Mill & Mills, 2018).

Taken together with the new developments of cognitive neuroscience and other psychological theories in the MBE literature, the results of multiple studies in diverse settings suggest that

interventions based on identifying students' most frequent mindsets, developing a more growth mindset, teaching metacognitive strategies, talking about brain plasticity, and promoting self-efficacy might be effective in improving their academic outcomes and potentially their job prospects (as discussed in Dweck, 2007). However, it is argued by Carol Dweck herself that the application of this theory might have been misplaced as it assumes, oftentimes, that there is a complete divide between growth and fixed mindsets (Dweck, 2016), since, as she explains in her book (Dweck, 2007) and more recent papers, individuals have mixed mindsets for different things at different times.

It is worth mentioning that the disruptive effect of the COVID-19 pandemic has challenged educators around the world to rethink their practices and shift their own mindsets about the teaching/learning process. The findings of this study might help educators, policymakers, and families shed light on the complexity of learning and how it forms a cosmos with different spheres that impact student achievement (Hedlund, 2021).

Future research will benefit from investigating interventions based on all of the four concepts discussed in this article and the impact they have not only on students' academic performance, but also on their career choices and success. I believe longitudinal studies can help understand how these beliefs and attitudes might carry on in individuals' lives and influence learning in the workplace. This review might also serve as a source of inspiration to teachers, school managers, teacher trainers, and policymakers to rethink teacher development programs and the role of skills and competencies which are not directly related to cognitive skills.

I must say, however, that beliefs and attitudes form only one aspect that influences learning. I believe anyone involved in education should understand – at least at a basic level – how different aspects can impact academic achievement and what are the main theories, principles, and empirical evidence relating to these aspects. There are emotional, motivational, learning design, and environmental elements interfering with and being affected by both cognitive processes and students' beliefs and attitudes. It was the desire to help educators and the entire school ecosystem reflect on this complex scenario that led me to the creation of a new conceptual framework that brings together many of these elements into a single illustration: the Learning Cosmos (Hedlund, 2021). I end this study with an invitation to explore the intricate universe that surrounds learners in the hope that this reflection will help impact achievement.

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APPENDIX 1. LIST OF INFLUENCES ON ACHIEVEMENT FROM MBE LITERATURE

Tokuhama-Espinosa (2014)	Hattie (2012)
1. Plan activities to grab attention	1. Self-reported grades, self-expectations, self-efficacy
2. Plan activities that stimulate memory	2. Piagetian (constructivist) programs
3. Plan to use spaced versus massed learning	3. Response to intervention (attitude)
4. Plan to incorporate repetition	4. Teacher credibility
5. Take advantage of variation and transdisciplinarity	5. Formative evaluation
6. Plan authentic lessons	6. Microteaching
7. Implement formative evaluation	7. Classroom discussion
8. Use product, process, and progress evaluations	8. Teacher clarity
9. Test to improve memory	9. Feedback
10. Develop shared, explicit learning objectives	10. Reciprocal teaching
11. Strive for clarity and immediacy	11. Teacher-student relationships
12. Provide feedback for mastery learning	12. Spaced vs mass learning
13. Nurture teacher-student relationships	13. Metacognitive practices
14. Believe in the role of plasticity and in your students	14. Acceleration
15. Foster metacognition and mindfulness	15. Classroom behaviour
16. Employ Zemelman and Colleagues' best filter when selecting activities	16. Self-verbalization and self-questioning
17. Develop students' ability to identify similarities and differences	17. Study skills
18. Develop students' summarizing and note taking ability	18. Teaching strategies (explanation, elaboration, modelling, demonstration, reminders of procedures
19. Reinforce effort and provide recognition	19. Problem-solving teaching
20. Provide purposeful homework and practice	20. Not labelling students
21. Prepare students to set personal objectives and give themselves feedback	21. Concept mapping
22. Teach students to generate and test hypotheses	22. Cooperative vs individualist learning
23. Use cues and triggers	23. Direct instruction

24. Use the Socratic method	24. Mastery learning
25. Cultivate the art of questioning	25. Worked examples
26. Incorporate problem-based learning	26. Peer tutoring
27. Incorporate cooperative learning	27. Cooperative vs competitive learning
28. Incorporate reciprocal teaching	28. Student-centred teaching
29. Incorporate case studies	29. Classroom cohesion and climate
30. Harness the power of analogies	30. Peer influence
31. Implement the 5Es: Engage, Explore, Explain, Elaborate, and Evaluate	31. Classroom management
32. Improve student self-efficacy	32. Professional development
33. Maintain high expectations	33. Goals
34. See learning as fluid	34. Second/third-chance programs
35. Appreciate the role of affect in learning	35. Small-group learning
36. Take the lead in social contagion	36. Questioning
37. Award perseverance and celebrate error	37. Concentration, persistence, engagement
38. Motivate	38. Motivation
39. Never work harder than your students	39. Quality of teaching as rated by students
40. Be passionate	40. Early intervention
41. Design engaging classrooms	41. Self-concept (cognitive appraisals: descriptions of pride, worth, confidence)*
42. Manage	42. Writing programs
43. Use thinking routines	43. Teacher expectations
44. Keep abreast of technology and flip the classroom	44. Cooperative learning
45. Adjust for ages and stages	45. Exposure to reading
46. Improve nutrition	46. Behavioural organizers, adjunct question
47. Get students out of rows	47. Reducing anxiety
48. Begin year-round schooling	
49. Change the school day	
50. Stop using tests as indicators of higher thinking	

*Codes highlighted in blue are related to non-cognitive skills

Source: own compilation based on Hattie (2012) and Tokuhama-Espinosa (2014)

GiLE Journal of Skills Development

Teaching Digitally-Ready Soft Skills for Employability: A review of the COVID-semester online-teaching strategies

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Abstract

The coronavirus pandemic triggered an abrupt change to emergency e-teaching and has accelerated the adoption of digital teaching practices in higher education. This transition from in-person instruction to online-only teaching took place globally and disrupted the conventional lecture format. While the catalyst, namely COVID, was the same throughout the world, a growing body of research confirms that instructors across the educational spectrum are experimenting with, and implementing, a plethora of methodologies based on their digital abilities and experiences.

This paper will critically analyse several online-based methodologies and digital tools developed and introduced at the University of Europe for Applied Sciences within an undergraduate module called Employability. The authors will use the six areas of the European Commission's DigCompEdu framework as a reference to analyse and summarise digital tool implementations and enhance students' digital collaboration skills, online experience, and learning outcomes.

The methodological focus is on teaching soft digital skills for employability, namely, digital communication, problem-solving, collaboration skills, as well as, digital content creation and media literacy in tandem with the main content of the course. Possible issues when teaching the Employability module in post-COVID offline or hybrid classrooms will be discussed, particularly with regards to ensuring that teaching formats are fit-for-purpose in increasingly digital, and remote, work environments.

Keywords: skills development, soft skills, digital collaboration, higher education, employability

1. The 2020 E-Emergency Teaching and The DigCompEdu Framework

During the spring of 2020 the COVD-19 pandemic catapulted teaching from face-to-face mode to "emergency e-learning" (Muller et al., 2021) or "emergency remote teaching" (ERT) – the term coined by Hodges et al. (2020). Teachers were suddenly required to boost their digital competencies. In a rather prescient and serendipitous move, three years before this disruption occurred, the European Commission's Joint Research Centre had already prepared and shared the European Framework for the Digital Competence of Educators, otherwise known as the DigCompEdu framework (Punie & Redecker, 2017). At the time, it was developed as a response to the growing "ubiquity of digital devices," and to provide instructors support in developing their digital competencies – an obvious prerequisite for teaching online.

This investigation will outline and examine the implementation of digital collaboration tools used in the Employability I: English and Employability II: Soft Skills modules taught during the second and third COVID-19 semesters of 2020-2021 at the University of Europe for Applied Sciences (UE). The courses were taught exclusively online at two campus locations, in the German cities of Berlin and Iserlohn. The four groups taught by the authors of this article were analysed according to the DigCompEdu framework, which provides a roadmap for enhancing student's digital competencies and information and communications technology (ICT) tools usage within a skills-based curriculum.

The concept of "lifelong learning" cannot be divorced from the methodologies and curricula of higher education. The speed at which technological advancement occurs and has had to be adopted since 2020 adds extra layers of both humility and urgency to the process of regularly updating course material, methods, and resources employed. Coming to terms with the "new normal" requires, first and foremost, a developmental mindset from both instructors and students, especially given that digital tools themselves are continually evolving. Those who embrace the challenges involved can, however, find new opportunities for innovation. Instructors can enhance and assess learning outcomes via a variety of ICT tools to translate real-life qualification assessment practices (Makhachashvili et al., 2021) into a blended or exclusively online format. Higher education students' perceptions of emergency e-learning during the COVID-19 pandemic showed noticeable differences in student engagement, participation, and learning skills compared to that experienced during in-person teaching (Cranfield et al., 2021). To all involved, the change in format is a significant step towards the evolution of education.

One key evolutionary aspect of teaching – well underway even before the pandemic began – is the trend toward knowledge- and skills-based teaching versus chiefly knowledge-based education (WEForum, 2017). Since the global financial crisis, awareness of the interdependencies and complexity in international markets has risen sharply, mostly due to factors "*subsumed by the term VUCA (Volatility, Uncertainty, Complexity, Ambiguity)*" as stated by Burgartz & Krämer (2016). Same research indicates that 83% of companies regard innovations as essential to their survival in the global marketplace. Within just three years, the top 20% of innovative companies grew at a rate that was almost 16% faster than those of their peers classified as least innovative. A skills-based curriculum focuses on building students' abilities to apply rather than repeat what they have learned, particularly within an interdisciplinary context and in original ways. Nurturing innovative approaches in the classroom will support students in mastering the skills of the twenty-first century and will

enhance their employability. Given the speed at which knowledge, practices, and products become obsolete in a VUCA world, both students and teaching staff must acknowledge this necessity and build their creative collaboration expertise while at school, cultivating skills that will prepare them for dynamic and disruptive working conditions.

Teaching how to apply soft skills in real-life situations, including highly developed social skills, is critical to helping students succeed in their future careers. As twenty-first-century economies shift from generating wealth via individualistic creativity to team creativity, soft skills are now a determinant for academic behaviour in online education (Cazarez, 2021) as much as gaining "effectively fostered through collaboration" (Larson & Miller, 2011).

The University of Europe offers an Employability course containing consecutive modules over the first three semesters of the Bachelors' degree programme across several majors. The first semester concentrates on Business English communication skills, designed for students with the minimum requirement of advanced level proficiency in English. The second focuses on soft skills for the workplace in the twenty-first century, and the third module centres around design thinking. Out of the Employability I courses offered, the authors of this paper taught a total of 56 teaching units for each of four groups during two subsequent semesters of 2020:

a) University of Europe, Iserlohn Campus. Two courses of predominantly German-speaking students, roughly 30 students per group.

b) University of Europe, Berlin Campus. Two courses of international students with English as a first and second language from approximately fifteen countries of origin, roughly 60 students.

The competencies gained reflect the skills delineated in Bloom's Taxonomy of Learning (Anderson & Bloom, 2001) and the DigCompEdu framework. To encourage students to perform critical evaluations of the materials covered, skills-oriented activities were incorporated using digital collaboration tools. In the following section, the methodology used to achieve these goals will be discussed.

2. How Digital Competencies Were Enhanced in Combination with Other Soft Skills

In 2016 it was already posited that the *"forces outlined in the VUCA model are beginning to find their way into the rarefied environment of Higher Education, necessitating an existential reappraisal of higher educational institutions well before the coronavirus made its entrance onto the world stage. Higher Education may have bypassed the Industrial and Taylor mass production revolutions, nevertheless, they are unlikely to be as easily able to evade the very revolution they enabled through the knowledge economy"* (Stewart et al., 2016, p. 242). The DigCompEdu framework reflects an acute need for universities to include digital competence in their curricula, preparing students appropriately for employer's changing demands.

3. Methodology

A number of training programmes, frameworks, and self-assessment tools have been created and put into practice to identify and assess digital competence for educators. The common European Framework for the Digital Competence of Educators (DigCompEdu) was created to facilitate teachers in assessing *"their competence, identify their training needs and offer targeted training"* (Redecker, 2017, p. 8). DigCompEdu was therefore selected for its reliability

and validity as a "scientifically sound background framework" assisting in guiding further decisions on training focus, programs, methods, and tools used for further teaching Employability modules. The interpretive analysis was adopted to gain a detailed understanding of teachers competence to provide digital collaboration training, identify their training needs, and detect the skills gap for further learning and development. This article illustrates how the DigCompEdu principles have been incorporated into UE's Employability modules, including in terms of enhancing students' digital competencies and achieving other overarching learning outcomes within the courses. The authors summarised the two-semesters classroom efforts to map what was achieved and where more focus is needed in the upcoming semesters. A self-reflective, interpretive analysis was based on the conceptual framework proposed by Redecker (2017) so as to see the limitations and skills gap for further improvement and to further incorporate the best practices into the updated curriculum.

The six DigCompEdu areas focus on different aspects of educators' professional activities:

a) **Area 1: Professional Engagement.** Using digital technologies for communication, collaboration, and professional development.

b) **Area 2: Digital Resources.** Sourcing, creating, and sharing digital resources.

c) **Area 3: Teaching and Learning.** Managing and orchestrating the use of digital technologies in teaching and learning.

d) **Area 4: Assessment.** Using digital technologies and strategies to enhance assessment.

e) **Area 5: Empowering Learners.** Using digital technologies to enhance inclusion, personalisation and learners' active engagement.

f) **Area 6: Facilitating Learners' Digital Competence.** Enabling learners to creatively and responsibly use digital technologies for information, communication, content creation, wellbeing and problem-solving.

Reformulating the specific accomplishments in each area according to the DigCompEdu framework in terms of the Employability modules provides instructors with a roadmap for further growth and further professional development in digital competencies and ICT tools used to enhance students' digital competencies in the hybrid learning mode once the lockdown is over.

An analytical summary of the UE Employability course outcomes according to the DigCompEdu framework:

a) **Area 1: Professional Engagement**. Leveraging in-classroom collaboration and discussion to foster asynchronous communication both on a corporate and personal level between students and teachers, sharing knowledge, experience, found topic-related resources, building curiosity into constant professional development.

b) **Area 2: Digital Resources**. Using various ICT tools and sources to maintain synchronous and asynchronous communication and collaboration by co-creating and editing digital resources.

c) **Area 3: Assessment**. Critically analysing students' progress in using various collaborative digital tools, providing a platform for peer assessment and room for growth, building regular feedback into the classroom.

d) **Area 4: Empowering students.** Providing room for an informed choice on how to use digital tools that correspond best to learning objectives and tasks, improving students' digital skills, collaboration and autonomy in terms of areas of study focused on and how to present their thoughts on these to others.

e) **Area 5: Teaching and Learning**. Teaching, coaching, facilitating, and assessing the development of digital competencies along with discipline-related tasks, encouraging students' online collaboration to support the individual learning journey.

f) **Area 6: Facilitating Digital Competence.** Supporting students to use digital tools creatively and responsibly to find, interpret, classify, evaluate, and co-create project-based content.

In the following conclusion, the achieved goals are summarised into three areas: digital communication and collaboration, digital content creation and media literacy, and digital problem solving, and are followed by critical points and suggestions for further research in the final section.

4. Conclusion

4.1 Focus: Digital communication and collaboration

To enhance students' skills at collaborating effectively using digital tools, regular breakout rooms, discussions, and digital collaborative activities were introduced and implemented within both the Employability I: English and Employability II: Soft Skills modules. The components of the collaborative peer-learning were presented methodically into the classroom. Students shared after-class feedback that they were regularly helping their peers proceed through the tasks. Instructors witnessed students sharing the related links and explanatory comments to facilitate task accomplishment within Microsoft Teams breakout rooms (further in text - MS Teams).

Throughout the semester, students were assigned to different groups in each class. During the regular debriefing after the task-based discussions in the breakout rooms, some students reported training in taking individual responsibility and practicing building trust with new co-learners when instructors assigned students into new mixed/randomised groups. Meanwhile, assigning students to stay in the same team during the 135-minute class and to fulfil their tasks within the same group contributed to growth in their awareness of personal accountability and cooperative skills even online, according to their self-reported post-class reflections. However, as students were building longer-lasting teams for their project-based semester exams, instructors practiced assigning students within their formed project teams to provide more time for the in-class tasks, time collaborating together, and building relationships. Students reported through the post-class feedback that it helped build up bonds within their final exam teams and increased productivity and efficiency.

In regards to working in teams, UE Employability students were challenged to interact with their international peers in the breakout rooms, with three to four participants in a discussion. It is the authors' experience that designing tasks for pairs and putting students into two might be suboptimal for larger classes. Intercultural tensions or reluctance to start a conversation might arise when two students in a breakout room are not well-acquainted or avoid switching on cameras, or simply have an unstable connection. Increasing the number of students to 3-4 in

a breakout room can minimise these factors and stimulate better-mediated and less polarised discussions. Other hidden issues might relate to previous communication between them, as well as, the concern that disparate opinions about a topic may potentially lead to conflictual situations and can drive them to retreat from the classroom activities.

Being more aware of these pitfalls, instructors can design more inclusive collaborative spaces so as to prevent a number of these self-reported issues, as well as, stimulate critical and systems thinking, collaboration and understanding, along with respecting different perspectives and views – this latter point is one of the key aims of both modules.

Reformulating the specific accomplishments in each area according to the DigCompEdu framework in terms of the Employability modules provides instructors with a roadmap for further growth and further professional development in digital competencies and ICT tools used to enhance students' digital competencies in the hybrid learning mode once the lockdown is over.

UE Employability students are routinely engaged in solving problems in smaller randomized teams and learning to create their own digital activities using a variety of digital technologies (see Figure 1) such as interactive ICT-tools. These include Cloze, Kahoot, Microsoft Forms and Surveys, Mentimeter, Padlet, and Quizlet as well as collaborative environments in Microsoft Teams, Excel, Word and PowerPoint, Mural and Google Jamboard.

FIGURE 1. INTERACTIVE AND COLLABORATIVE DIGITAL TOOLS USED TO ENHANCE STUDENTS' DIGITAL COLLABORATION FOR EMPLOYABILITY MODULE AT UNIVERSITY OF EUROPE IN 2020-21

Source: Own compilation

Students first learn how to complete an exercise or take a quiz online, then go from takers to makers, creating their versions for each other after collaborating on the design and relevant content. They are encouraged to analyse and discuss the benefits and drawbacks of each, and to evaluate the professional context in which this tool might be used most effectively.

Brainstorming, classifying data and opinions, creating and refining input into the digital visualisation or frameworks within a given professional or educational context take place frequently during the classes.

In addition, the intention was to train students to systematically co-create, co-construct, and share the results of their discussion and collaboration through the use of digital whiteboard collaboration tools such as Jamboard and Mural. During the course, students showed improved online collaborative skills as their abilities evolved from complete unfamiliarity with online visual collaborative tools, to creating and reviewing digital content with their peers, choosing the appropriate ICT-tools for a given task, adapting communication strategies to a specific audience, and demonstrating their awareness of cultural and generational diversity in digital environments.

4.2 Focus: Digital content creation and media literacy

A variety of activities were incorporated into the digital environment via synchronous and asynchronous assignments and post-task assessments, to encourage the mastery of digital content creation skills. Employability students at UE learn to classify, modify, evaluate, and create digital content, and to integrate and refine information into different formats using Common License copyright, licenses, and references appropriately. UE Employability module students are also systematically challenged to search for current data, business analyses (Harvard Business Review, Gartner & World Economic Forum reports), and case studies to illustrate the concepts and frameworks taught in class.

To build their ability to assess media messages critically, students were introduced to the Media Literacy Framework by Christ (2016) and Schilder & Redmond (2019), which train the user to ask key questions when assessing the credibility of a given information source. Students then searched for advertisements and applied what they had learned, analysing their subject by exploring who wrote it, for what purpose, to which audience, with what formats, and why certain content was chosen, and what other related information was not included.

## 4.3 Focus: Digital problem solving

It was already apparent pre-pandemic that "the VUCA forces will present businesses with the need to move from linear modes of thought to problem-solving with synthetic and simultaneous thinking" (Stewart et al., 2016, p. 241). To incorporate interactive and collaborative learning activities, asynchronous assignments, and post-task assessments, Employability module UE students were introduced to and given a forum to practice applying problem-solving techniques. By identifying and addressing case study problems that were either individually chosen or provided by their instructors, students found themselves in near-real work situations. After discussing their options, creative group-work solutions were transferred into a visual digital collaboration board (Jamboard, Mural, Whiteboard) and they considered viable ways to adapt these practised solutions into new business-oriented situations.

To implement this "learning by doing" approach, the instructors introduced digital collaboration tools and their main features one by one and task by task, increasing the complexity as students gained experience in using them. By building their skills from Awareness through Acquisition to Application, followed by Experimenting and Evaluation, to

finally reach the Creation level, they self-evaluated their digital collaboration skills according to the Six Levels of Skills Development Framework (Shtaltovna, 2021), see Figure 2.

FIGURE 2. THE COLLECTIVE SYNCHRONOUS SELF-EVALUATION OF THE COLLABORATION, CREATIVITY AND DIGITAL TOOLS/COLLABORATION BY THE EMPLOYABILITY II STUDENTS AT UNIVERSITY OF EUROPE, 2021
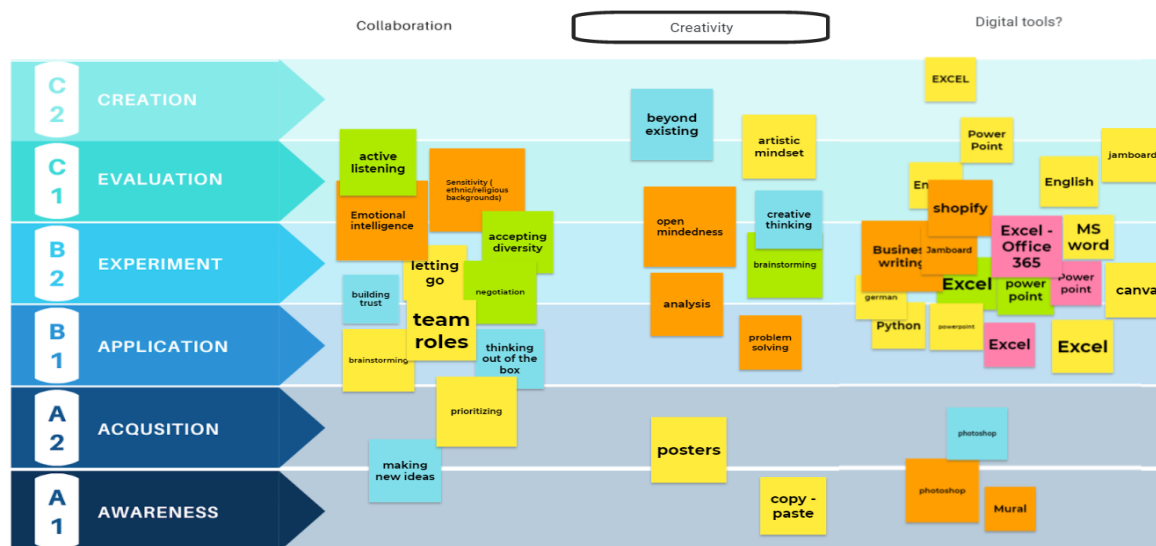
Source: Jamboard Collection Employability, Shtaltovna, 2021

This self-assessment framework allowed students to self-assess their collaboration and digital collaboration skills in teams for evaluating several subskills in real time. They saw where they progressed during the online semester and identified where to focus their future efforts. The student teams first brainstormed what constitutes each competency representation (tools and skills in terms of using them) and then anonymously and individually identified their levels, by evaluating and weighing them against the professionals' levels. The fonts automatically fill in the sticky notes in the Jamboard tool, therefore, they do not represent a metric here.

When the instructor debriefed the class on proposed solutions, students were invited to consider efficient ways to use the tools, and in which cases these tools could be used similarly or even more creatively. Students could adjust and customize digital environments further according to their team and personal learning/professional needs. Students reported that this framework helped them in various ways. They realised the complexity and overlapping aspects of the subskills as well as identified and celebrated their learning journey. They recognized the milestones they experienced and formulated where to invest more time and effort, should they wish to refine a specific skill further.

5. Further research and critical points

Several trends are emerging in the higher education landscape. Challenges to the status quo of the higher education sector pre-pandemic already included the trend toward mobility,

increasingly known in the wake of the coronavirus as the Work From Anywhere (WFA) movement (WEF, 2021). Another key trend remains the increasing accessibility of knowledge. Related to this access is "*the increasing size of the market for learning, creating new competitors outside of traditional university programs, as well as the affordances of technology to augment, improve and economise program delivery*." Higher education is no longer an observing non-participant, viewing technological and social developments from the safe distance of its "cloistered classrooms" (Stewart et al., 2016, p. 246).

Given the dynamic nature of these developments, further and continuous research into up-and-coming technologies designed to facilitate the move from office work to working from "anywhere" is needed. For example, a "visual email" application, Loom, arrived on the market, and given the likelihood of its growing popularity in a remote work environment, student familiarity with this form of communication is likely to be an additional helpful digital soft skill which could be introduced and practised in future courses.

As online applications are subject to regular updates, with features added or modified, instructors should not only track the development of new technologies but ongoing changes in those they already employ as well. This paper is based on the authors' continually evolving digital competencies, developing through online experimentation with students since the initial abrupt switch to online education. Future class preparation should include the latest advances in these and other tools employed in the class.

Additionally, a more detailed methodology with which students can express their reactions to the various tools and teaching styles they experience in the course is currently in development. Changes may be appropriate if and as students' beginning competency level changes, depending on what they are learning in other courses whose instructors are equally cognisant of, and respond to, external trends accelerated by the events of 2020.

It is a year that will likely go down in history as the epitome and prime example of what it means to live in a VUCA world. Post-pandemic, the long-term effects of the coronavirus will continue to affect not only individual educational institutions well into the future, but the face and structure of education itself.

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The Development of Competencies for Employability
Digital Competencies
Influence of the Industry 4.0 concept on digital competencies

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Abstract

The term called Industry 4.0 (I4.0) is an umbrella-concept, which encompasses several elements from the latest technological trends influencing the human workforce and education. But the questions arise: Does the industry 4.0 concept itself change workforce competencies? What is the impact on education? Thus far, only the technological aspects have been investigated thoroughly, despite their well-known, and strong, influence on the economy and society. This study addresses the interactions, dependencies, and correlations between certain areas of social existence, as expectations change regarding human competencies and their continued role in economic sectors and technological innovation. The role of the human factor within society is unquestionable as we start to understand why industrial revolutions have appeared. Fundamentally, it is always human concerns that stimulate change and it is human/social aspects that are heavily influenced by the same changes. As the I4.0 concept has an influence not just on how products are manufactured but also on the practices of consuming "products", governments, research institutes, education systems, and organisations all have a crucial role to play in managing the massive wave of change. We believe that the concept should be more

deeply analysed and understood, as it might give rise to a new complex terminology for techno-social change, which eventually would feed into achieving economic goals more efficiently.

1. Introduction

An increasingly globalised world and the use of advanced technologies (e.g. Artificial Intelligence, Machine Learning, Robotic Process Automation, Industrial Internet of Things, Additive manufacturing methods like 3D printing etc.) in manufacturing and processing industries together draw attention to the question of whether the necessary human skills and competencies to be competitive are well identified and education systems have already adopted the right approach. In this study we analyse the current trends, which we refer to as the I4.0 concept, and investigate the relevance of new digital competencies our area of focus, which encompasses the small and middle-sized (SME) companies in the Hungarian manufacturing and processing sector. The perspective of the research is based on similar European studies and research and Hungarian high-level education strategies. The examined studies and literature which are the reference of this cooperative research have led us to draw our own conclusions. Our goal is not just to evaluate our hypothesis that I4.0 is making new competence demands, but also to investigate the potential impact of the validated hypothesis on the education systems, and indirectly to employability in the future (Lorenz et al., 2015). It is a fact that the I4.0 concept has not developed in the same way worldwide, in Europe, or even among different industry sectors. In this study, the differences in maturity that are highlighted may be used as an opportunity to check the leading countries' situation and conduct a comparative analysis with the Hungarian reality. Enhanced skills and competencies are required to remain at the forefront of the new technological revolution and one of the biggest concerns in terms of technological, social, and cultural advancement in the workplace is the pressure to decrease operation costs and the increased prospect of unemployment faced by people who are less prepared for the changes that are coming (Demirkan, 2016). The potential of using advanced technology including the I4.0 elements like machine learning, intelligent process automation, collaborative robotics, decentralised manufacturing management, horizontal and vertical system integration etc. (Tan et al., 2017), will redefine most jobs and at the same time eliminate some of them and generate new ones. As the competitiveness of an enterprise is highly dependent on the way work is done, the technology employed, and the know-how of the employees, the competence of the individual is a crucial characteristic (Jensen, 2019). Competence is generally viewed as the main term that encompasses more specific concepts such as knowledge, skills, abilities etc. As one of the main roles of the high schools, universities, as well as adult post-graduation education is to improve these elements, it is axiomatic that identifying what areas to focus on and the practical orientation of education are both of crucial importance. Considering the complexity and multidisciplinary of the topic in the study we conducted a systematic literature review, which offers an overview of recent research and follows a concept-centric approach.

2. Digital transformation

Different countries have different standards, and it is also the case that the "digital transformation in higher education and society" cannot work with the same method in each case (Jensen, 2019, p. 5). However, it should be kept in mind that "graduates from universities aim

for important positions in the public or private sector and they are the future knowledge workers" (Toarniczkya et al., 2019, p. 2). "Digital transformation at the global level" aims to define high-level and comparable standards, to "determine the key values and principles that are pivotal to shaping a meaningful, human-centred digital future for the common global good, regardless of where in the world we are physically based" (Jensen, 2019, p. 5). On the other hand, technology is a barrier, and "unequal access to the internet implies unequal access to information, knowledge and international networks" (Jensen, 2019, p. 17). "Communication and technology have an important role in life especially in education" (Kiss, & Gastelú, 2015), therefore digitalisation requires a common solution that shapes the future positively.

"Global connectivity has created not only borderless classrooms, but also virtual workplaces" (Tan et al., 2017, p. 13) to which the entire world needs to adapt. One of its essential elements is to re-create the higher education system as well as to develop skills like "sense making, novel and adaptive thinking, virtual collaboration, transdisciplinary, cross-cultural competency, social intelligence, cognitive load management, new media literacy, a design mind-set and computational thinking" to prepare for a successful future (Tan et al., 2017, p. 13). Taking everything into consideration, the task is clearly far from simple. There are several stakeholders, affecting many areas through society, economy, and fundamental human rights. The process has begun, and COVID-19 has accelerated it. Scientists and decision-makers of the present age have an opportunity to shape the processes advantageously. As a recent BCG report (Lorenz et al., 2015) identified the technologies driving the world of work towards the industry 4.0 concept, (Figure 1) the study could declare that these are "quantitative effects on the industrial workforce, we studied how the ten most influential use cases for these foundational technologies will affect the evolution…" (Lorenz et al., 2015, p. 4).

FIGURE 1. EFFECTS OF INDUSTRY 4.0 ON THE WORKFORCE
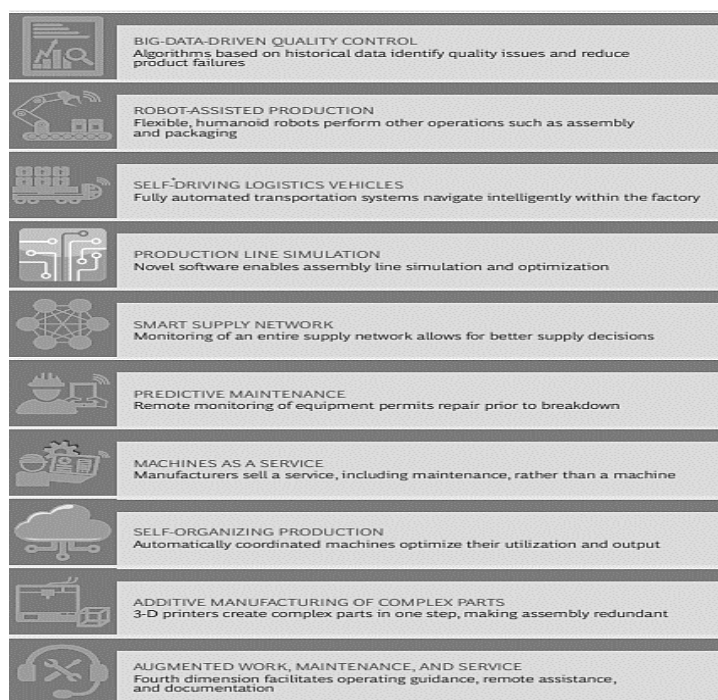
Source: Lorenz et al., 2015, p. 5.

The study was focusing on German industry, which is representative from an Industry 4.0 concept adaptation aspect. The adoption of I4.0 is a process; to define it more precisely, it is a change implementation where the identified and chosen technologies will be adopted. As these technologies may require a different method or way of working to operate them, the operational structure and operative processes may need to be also changed. This change is usually called digital transformation. As Demirkan (2016) observes, "Digital transformation is the profound and accelerating transformation of business activities, processes, competencies, and models to fully leverage the changes and opportunities brought by digital technologies and their impact across society in a strategic and prioritised way" (Demirkan, 2016, p. 14). Moreover, "technology will not improve business digital transformation and will not add competitive advantage on its own, it will need a structural change and development agenda to link and align digital strategy principles to specific business domain and definite business strategy, both in the short-term and long-term" (McKinsey, 2017, p. 2).

The literature and studies reviewed thus far lead us to our first conclusion: if I4.0 elements are planned to be adopted by an enterprise, it will initiate the digital transformation process, which goes beyond simply the technology. As a recent McKinsey study estimated (2017), the whole business model and its support functions will need to be redesigned strategically, which should be combined with the new technologies. Obviously, this will require a different competency set-up.

3. New competency demand

There seems to be wide agreement that the advance of automation and digitalisation will continue to transform the competency requirements for employees over the upcoming years. However, it is difficult to predict exactly how the importance of each specific individual competency will change, or which competencies have a low capacity for automation and will therefore be in demand in the labour market. Technological change cannot be accurately predicted, so any attempt to imagine the future is inevitably subject to uncertainty (Vogels, Rainie & Anderson, 2020). So far as the technology-related megatrends are concerned, their influence on the labour market is obvious. Every area of the labour market, whether blue collar or white collar, will be affected. "Intelligent algorithms" could very rapidly replace those jobs whose steps could be documented. "One-third of current jobs requiring bachelor's degree, can be performed by machines or intelligent software in the future" (Vogels, Rainie & Anderson, 2020, p. 17). Due to the changes, a new category of jobs will appear. However, it is necessary to note that, "a gradual transition will take place, which has already commenced and differs from industry to industry and from company to company" (Blundell, 2020, p. 647). If we adopt the hypothesis that the education system needs to reflect the needs of the industry and labour, it is important to investigate the interdependencies and interactions between all concerned parties (Irving, 2020). The authors of the current paper, in broadly examining the topic observe that as a preparatory step, all concerned parties must be identified (this is not as obvious as one might assume). Several questions shall be asked before planning the research, such as: What is the purpose of technology? For what do we use technology? Who wins from developing and using the most advanced technology? What are the goals and roles of the government, different research institutes, and different education systems? Is there a network or hierarchy between the actors? All of these questions should be investigated in order to reach a deep understanding of the current research problem.

Technology megatrends are often approached from the perspective of Moore's law (Gordon E. Moore, 1965; Intel.com, 2021), whose exponential curve describes the increase in the number of network devices, or the computing performance of CPUs. As Némethy and Poór put it, "new technologies are increasingly becoming part of everyday life, not just pulling industries, they shape the world of work as a privilege" (Némethy & Poór, 2018, p. 222). In the current study, the authors also draw the conclusion that technology is improving faster than profit-oriented enterprises can adapt to it to achieve economic goals, as well as much faster than society can understand and adopt it. If we accept this statement, on might infer that the gap is steadily increasing between the capability of technology and the (average) human competency. The side effect of this would be that even advanced technology is theoretically available and human competency imposes a limit on maximising the achievable benefit. The education system, and especially the universities, which are closest to the labour market in the case of white-collar positions, is coming under huge pressure to fill this gap. If we wish precisely to understand what digital transformation means, and what its impact on existing business models is, production systems must be seen as crucial elements.

Digitalisation is a complex phenomenon, and it does not "just mean 'remote'!" (Engler, 2020). It is an "unavoidable rung on the ladder" (Nugent, 2020). Digitalisation is "using digital technologies in combination to blur the boundary between the physical and the virtual worlds" (Moore, 2015). It is necessary to recognise the "digital impacts of the business", the way systems work in detail and to "deploy critical skills which are essentially needed to fuel the re-imagined business model" (Engler, 2020). From this perspective, it is important to investigate the relevance of knowledge which is depicted thus by Schüppel:

FIGURE 2.
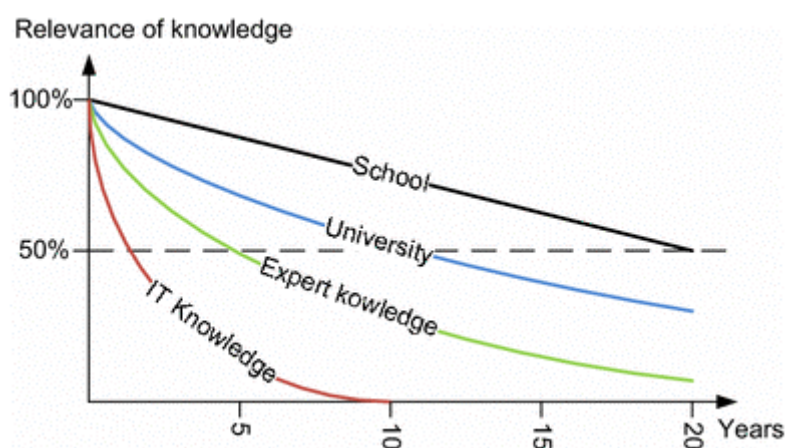
Source: Saracco, 2018

As Saracco (2018) has mentioned, "new knowledge become available, while previous knowledge becomes obsolete. The speed of obsolescence varies for different types of knowledge and in different areas". Indeed: should a student still learn to do the square root of a number or instead be required just look at the answer given by a calculator on a screen?

In the meantime, the knowledge half-life (the time it takes for 50% of what you know to lose its value, become useless, superseded) is shrinking, it is now below 5 years in technology areas

(as shown in the graphic, IT knowledge's half-life is less than 2 years!). More than ever in the past, knowing how to ask the right question as well as "whom" to ask have become crucial skills (Saracco, 2018).

Each education system has a certain latent capacity to react to the new demands. One of the main tasks in these organisations to manage this latent potential, as it is not necessarily an obvious goal to minimise it, given that the primary role of a university is to provide a robust knowledge base which is supposed to be future proof. Different knowledge areas have different knowledge obsolescence, and this results in different optimum levels of latent capacity. It shall be admitted that knowledge has future-proof elements as well as a bigger or smaller package of dynamically improving competencies and skills. In addition to companies, employees, and societies, education systems, and legislators also face the task of meeting the new challenges resulting from constantly advancing technology. As Gehrke et al. (2015) puts it, "the demand for technical talent will drive the shift of job creation within manufacturing industry, requiring more qualified personnel on the shop floor. Companies will need a skilled workforce to develop and run advanced manufacturing tools and systems and to analyse the data received from machines, consumers, and global resources. This results in a rising need for skilled workers trained in cross-functional areas and with capabilities to manage new processes and information systems" (Gehrke et al., 2015, p. 4). In a society that seeks to innovate at multiple levels, it is essential that both the professional and policy-making levels recognise both change and the need for change. The VDI study cited above portrays the competency pyramid described in Figure 3.

FIGURE 3. QUALIFICATIONS AND SKILSS FOR THE FACTORY WORKER
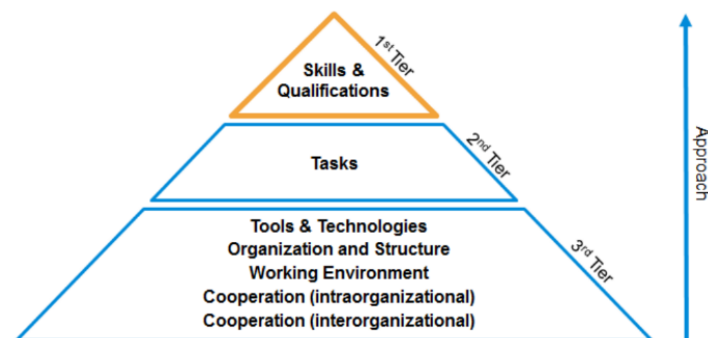
Source: Gehrke et al., 2015

As indicated in the pyramid, the 3rd tier constitutes the basis for the 2nd tier, which in turn constitutes the basis for the 1st tier. The study focuses on the potential new demands and the architecture of competency but does not estimate the extent of existing individual or organisational know-how and knowledge obsolescence. Nevertheless, the value of the study resides in its portrayal of the levels (or tiers) which may help an organisation to evaluate and establish an accurate picture of the demand for a strategic competency or skill. From the authors' perspective, the process of change can be caused by external or internal factors, or by an internal imbalance that can be derived from economic factors in addition to social

inequalities. The obsolescence of the structure of higher education and the need for a service and market-oriented approach expected by industry together have the power to induce change. This change is still taking place. Following such a recognition, the transformation of higher education in Hungary has started, which is outlined in detail and comprehensively in the medium-term policy strategy document titled "graduation in higher education.

4. Driver of the change; what makes a difference

First and foremost, Europe is facing significant societal challenges due to globalisation and digitalisation, in which collaborative behaviour is needed to promote economic growth and prosperity. Universities have a significant role to play in "rethinking problems and finding solutions" and they represent one, extremely essential, side of Kálmán's "Knowledge Triangle" model (Kálmán, 2019). The universities' capacity to create knowledge is a great source of solutions to problems. When it comes to evaluating the extent of knowledge production, Csath has mentioned that the GDP is not the most appropriate tool: "only expenditures on knowledge creation – education expenditures, R&D expenditures – can be taken into account with the help of GDP, and certain results, such as acquired knowledge, can be measured with it" (Csath, 2020. p. 30). In presenting quantitative growth, both the authors of the current paper and Csath agree that knowledge creation has a direct impact on economic and social sustainability. According to the authors, the current education system is not fully aligned with market needs, a situation which does not necessarily depend on the professions. Networking and interconnectedness are focal components of the I4.0 (Gehrke et al., 2015). Workers will collaborate and communicate without borders as they will utilise smart devices which connect them in real-time to their co-workers and workplace tools or even education systems or training service providers as needed. For example, collaborations with research institutes, universities, and parties that are not classical suppliers will increase due to the interdisciplinary character of digital production or I4.0 (Gehrke et al., 2015). All of the literature points in the direction of industry or its economic goals setting the target to adapt I4.0. From a technology perspective, different and customisable elements are available, so competency characteristics could be defined by an organisation that is prepared to think strategically. Our base hypothesis can therefore be accepted: the I4.0 concept is playing the role of a change agent in respect of the competency characteristic set-up for the factories of the future.

5. Impact to the education systems

The role of education has changed a lot over the decades. The requirement to offer a simple educating ability of the higher education institutions is not a driving force any more, but must appear as the third mission in the appropriate ecosystem context in order for a university to be attractive on the market (Compagnucci & Spigarelli, 2020). A transformation took place in the education market, in which the knowledge economy became a central issue, due to globalisation, digitalisation, the global crisis and its associated challenges. Universities have huge potential to be the agents of change and contribute to regional innovation (Kálmán, 2019); however, they should first find an appropriate balance between the scope of their research, the needs of the market, and the delivery of education. In the Triple Helix model the collaboration of academia, industry and state-sponsored science makes an innovative atmosphere possible (Makai & Rámháp, 2020). The extent of the missions may differ from university to university, however by acting together these collaborators can create a path towards regional innovation and societal change, in which the higher education institutions have immense potential

(Kálmán, 2019). The I4.0 concept strengthens the relationship between university and industry, supports the strengthening of the technology and knowledge transfer processes, and forces the university to transform itself (Makai & Rámháp, 2020) and be the engine of economic and societal growth (Cai, Ma & Cheng, 2020). The needs of the labour market and society require higher education institutions which actively support technology change, international cooperation, and continuous change in skilled labour requirements, as well as providing the basis for innovation and lifelong learning (Fejlődésgazdaságtani szakosztály, 2020). That is why the situation of the universities has become a key question.

Education systems will certainly investigate the potential impacts of I4.0, and, based on a gap analysis, actions will be taken. Hungarian higher (university or higher) education systems have the right to make autonomous decisions, and design and implement their own career structure or even education methods, but next to it government provides a countrywide approach, with an education policy which may also reflect the megatrends or challenges. Our research and sample based exclusively on a Europe-wide literature review painted a clear picture that many universities – albeit mainly the directly concerned technical universities – have put digital competencies and digital education methods in the spotlight. The Covid-19 pandemic has obviously accelerated this at least from a training or pedagogical point of view, but education in digital competencies represents more than digitalising the education. Digital competencies mean that both method and content shall comply to the new expectations. As M. Lorenz (Lorenz et al. 2015) and his fellows described in their studies there are more elements universities need to work out, and as these education systems get prepared, industry will the chance to obtain the proper competency set directly from them. From the three pillars (university – industry – government) of the Triple Helix model, the first requirement is a need for broader skill sets. However, even this is not specific enough as the nature of the I4.0 is that it is not only widens the technical competency needs but also requires real interdisciplinarity, as for example a mechanic engineer shall have IT coding competency as good as business process or knowledge of economics and even sociology. As the authors of the Boston Consulting Group report observe, "many current educational programmes at all levels provide highly siloed training and offer limited interaction among fields" (Lorenz et al. 2015, p. 14). The requirement relating to the second pillar is "close the IT skills gap". This element is an obviously important but complex topic. As our study has investigated knowledge obsolescence, IT knowledge was found to be the most critical aspect. IT development platforms are improving and changing as fast as the computers on which the development shall be performed and later the application or algorithm is operated. At this point universities, education systems could find themselves facing a huge challenge to their business model. "If you want to study psychology, master computer coding, or complete an MBA, why would you pay big fees to a large university to support its infrastructure costs and hear someone lecture in a huge hall, when you could watch the world's best experts from the comfort of your apartment or on your phone, wherever you are? The old university model is becoming obsolete" (Fischetti, 2019). Fischetti puts a critical issue to the table, which is that thanks to the technology, the infrastructure and so on, the financing of universities' infrastructure cost may lose its importance. This is an additional pressure why education systems need to find new ways to reach students. This leads us to the requirement relating to the third pillar, which is to offer new formats for continuing education. As the Boston Consulting Group report puts it: "Academic leaders should prepare the education system to support the ongoing requalification of the industrial workforce, recognising the need for training to take place in more settings than only the traditional off-site locations. This support

could include providing online-learning platforms and access to free courses at "open" universities, which have no entry requirements, as well as using mobile apps to offer training and access to know-how. Universities could also offer a free, high-quality "massive open online course" in programming to all citizens. Academic leaders should work with business leaders to discuss their companies' specific training needs. This collaboration could lead to new education models for business, such as instructional programmes aimed at building capabilities rather than conferring degrees" (Lorenz et al. 2015, p. 16).

In the knowledge economy, the innovation of the education system is key (Kaloudis et al. 2019, p. 11), not just because they are the locus of knowledge transfers, and supporters of innovation through university spin-offs, start-ups, publications, and patents but also because they are the source of knowledge and source of the skilled human workforce. One of the goals of education is to bridge the gap between students and the challenges of the future by helping to find adequate responses to emerging challenges such as globalisation, digitalisation, the changing needs of the humanity, and new ways of working. An important goal, in line with the profile of universities, is the generation of a competitive workforce, as well as research that contributes to the production of knowledge and the development of the economy (Fonyó, Hausz & Kardon, 2016 pp. 47-50). This requires a synergic approach in the innovation ecosystem, a cooperative working relationship between the state, the university and industry, as well as long term strategic planning.

The education system faces many challenges due to the rigid and inflexible work conditions, however among its aims are: to find new education strategies, to introduce creativity in the education system, to provide adequate answers to the challenges of the world (Yordanova, 2019), to be in line with the I4.0 needs, and to provide useful knowledge to the industry. The universities today occupy an outstanding position. They are symbols in scientific, cultural, and moral terms as well as the facilitators and pioneers of innovations (Bejinaru, 2017). It is therefore very important that they transform themselves, to become the engine of the economy and find a way in line with their profile to be the solutions to the problems raised by I4.0.

The challenges raised by Industry 4.0 may have been felt especially keenly in higher education – Motyl et al's survey (2017) shows this is certainly true among engineers – but the effects can be felt in every area of working life. Effective performance and specific job knowledge have become necessary in the industry in order for one's employer to be successful and if one wishes to be able to contribute to the firm's value creation. This expert knowledge should be combined with a broad IT knowhow and specific skills are necessary in the transformed work environment (Nico et al. 2017, p. 12). This change demands a totally new way of thinking and working, combining many soft and hard skills. It requires creativity, innovation, critical thinking, problem solving, in-house and external collaboration, work autonomy, flexible work hours (PwC, 2018) as well as digital literacy on the part of the employees. Many studies differentiate among multiple competency levels (with these levels receiving different designations in some cases), which are:

a) Technical skills: Basic and specialist knowledge from a person's own specialty/discipline.

b) Data and IT skills: Control, use, checking of data-based systems, data analysis, data security/data protection, etc.

c) Social competence: Interdisciplinary cooperation, project management, communication skills, organisational and leadership competence, decision-making competence, etc.

d) Personal skills: Self-initiated learning skills, analytical thinking, problem solver mindset, capacity for abstract thought, openness, flexibility, etc.

These categories are non-homogeneous sub-fields of the identified competence areas, and the education system needs to be prepared to support the ongoing requalification of the industrial workforce. This means that in the name of life-long learning approach these sub-fields must be continuously in focus and must be maintained with a view to future redesign. Where digital skills are concerned, the crucial aspect is not knowledge of certain IT tools, or a development environment (programming language), but rather also the data management principles, cloud, edge and fog computing, network technology, M2M communication and the ability to support advanced technology-supported problem solving using simulation and modelling methods.

The world has become "globalised, automatised, virtualised, networked and flexible" (Motyl et al., 2017) and higher education institutions should make the students ready for these needs. For the future universities it is essential to take into consideration the necessity of their role. Universities are the creators of "tomorrow's technology leaders" and they can contribute to industry's competitiveness by promoting "dual-track education" in which students learn the theoretical background at the classrooms and practical skills at the workplace (PwC, 2018). Within education, excellent teaching, experts from the branch, high quality trainings, lifelong learning are necessary for the successful industrial performance and industry should be actively involved in designing the higher education of tomorrow's technology innovators. One particularly vital element is an ability to adapt to the changes that are to come on the part of the institutions and employees (Nico et al., 2017). Transformation of one's work conditions requires complex skills from the employees; the universities should make the future employees ready for the needs of a job world undergoing transformation by making them ready for the high tech skills and for the "complementary skills" such as management, communication, leadership, emotional intelligence and so on (PwC, 2018).

It is an eternal question how to measure, evaluate the digital skills, competencies. All organisations make an effort to define measurable KPIs (key performance indicators) regarding the skills competencies of the human resources. If these skills or competencies are crucial to achieving the strategic goals of the organisation, its evaluation system must be objective and relevant. It has always been a proven method to measure technical and IT knowledge via theoretical tests and exercises. Even without previous training, the competence level of an experienced employee can be measured and evaluated. Education systems are widely using this to fine-tune and customise the training they offer. Other elements are mostly soft skills, for which impressive task-based assessments and integrated role-playing training workshops have been developed in recent decades. Based on the literature review, it is commonly stated that more traditional education systems and universities ought to operate with this approach, as it may increase the effectiveness of the evaluation and the involvement of the trainee/student in the development process.

6. Conclusion

As a result of this study, the authors have realised that the I4.0 concept significantly changes the competencies expected from the workforce, and demands adequate answers from the universities, who represent knowledge generators and the source of much of the professional workforce. The impact of the I4.0. concept challenges the higher education system. Their transformation is essential not only due to their social and environmental responsibility, but also because it is part of their mission to educate the future workforce appropriately to meet the world's demand, as well as to minimise the gap between what is learned and useful knowledge. Overall, the authors have found that lifelong learning plays a key role, especially in the transformation of the university structure. For employees, the issue is not simply having or acquiring future-proof competencies. They also need to receive training on a continuous basis in order to have up-to-date knowhow and to be able to respond rapidly to the changes in occupations where rapid digitalisation and automation have appeared, as well as to demonstrate flexibility, an attribute that is becoming more and more essential on the labour market. Lifelong learning is essential for universities and other education providers. Learning is a double-edged sword. Taken broadly, it means making students ready for the needs of the industry and society; on the other hand, it also means learning how to cope with the teaching in the present system. Lifelong learning goes hand-in-hand with the transformation of the economic structures' needs which allows the creation of quality jobs that require more knowledge and creativity, with the potential to be implemented at different levels. In accordance with Csath (2020), much more attention should be paid to human and social factors; for example, investments should be better divided between physical, mechanical, and other technical areas and investments in people, knowledge and social development (Csath, 2020). Researchers examining the role of small and medium-sized universities in the Central and Eastern European region have concluded that the role of universities far from cities is crucial to the regional innovation system; however, the economic impact of these universities is still smaller than in more developed countries (Birkner & Mahr, 2016). In fact, the real contribution of universities is essential for the future and makes it possible to create increasingly complex networks of relationships, building new local and regional innovation ecosystems. Training systems require more space and time to be re-designed, and both dual and postgraduate training should be given more space to implement practice-oriented training imparting stable basic knowledge. Companies should also be involved actively in the education, who should on the one hand have their own training department with up-to-date knowledge, and on the other hand seek opportunities to supply to new types of professional training in a much more flexible and accessible way. Despite the fact that the authors have individual research interests, the existence of certain points of connection clearly indicates that further cooperative research opportunities are possible. It has been agreed to continue the research and analyse the interconnection of the I4.0 technology megatrends and their influence on the digital competences demanded by the labour market.

As can clearly be seen, innovation is a vital part of business, part of education and part of private life. As humans, we cannot ignore it, but we should grow hand-in-hand with it. Our long-term goal as researchers is to identify the importance of the "Industry 4.0" in our contemporary world as well as to make possible the integration of the "Industry 4.0" concept into higher education and inform businesspeople. This paper represents an introductory stage, providing a broad overview of "Industry 4.0" and its connection with the needs of, and changes happening in, education.

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Wellbeing and Engagement in Hybrid Work Environments – Coaching as a Resource and Skill for Leaders to Develop

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Abstract

This paper explores how working from home has impacted leaders and the workforce in corporate environments during the pandemic, how these experiences might influence the workplace of the future, and what role coaching could play to foster skill development in the 21st century workplace. Before the pandemic, plenty of research had already been done on what factors influence well-being and engagement in the workplace. Models explaining the elements of well-being and engagement, as well as, tools to measure their existence or the lack of have been reviewed, tested, and validated. We know little at this point about what combinations of factors caused the decline in well-being and engagement during the pandemic, and what skills in leaders, or requirements for the workplace would be necessary to hone and implement, to improve the situation of well-being and engagement in future work environments. This paper explores how coaching could support leaders in the 21st century workplace. The business world is facing challenges while moving into post-pandemic workplace scenarios. The plurality of interests increases the complexity of the topic. The literature on well-being and engagement has been reviewed. Data that was collected during the pandemic by different organisations and conclusions drawn from these were compared with what the literature says and it was combined with experiences the author made in the field while coaching leaders and their teams in corporate environments during the pandemic. This paper concludes with a recommendation on how to enhance coaching skills among leaders and to build their knowledge and literacy in the field of coaching, to result in positive effects on workplace well-being and engagement in contemporary work environments.

Keywords: wellbeing, engagement, hybrid work, leadership, coaching, 21st century skills

1. Introduction

This paper expands on the author's previous publication in the GiLE4Youth Conference Proceedings (Franzen-Waschke, 2011), namely, how the pandemic impacted engagement and

well-being for leaders and the workforce while working from home during the Covid-19 pandemic in 2020. This paper touches on how controversially the return to normal office scenarios was discussed in the first half of 2021 by both the workforce and employers. Different stakeholders with different needs and interests perceive how and from where work in the office can be done in different ways. The focus of this paper will be on the role of coaching and how coaching and facilitated conversations could help leaders and the workforce of the 2020s to transition with less opposition into the new work era. Additionally, this paper will explore how to maintain and re-establish well-being and engagement in contemporary work environments by building on existing and obtaining new knowledge and skills in those fields. This paper will end with a recommendation for future research to be conducted to produce more reliable data to underpin the positive effects coaching and facilitated conversations can have on leaders and their workforces in the corporate world.

This topic is of growing importance, as a lack of well-being and engagement was reported in various articles published by researchers around the world (Bernstein et al., 2020; Singer-Velush et al., 2020; Campbell & Gavett, 2021). The repercussions of the biggest experiment of our time as Bernstein et al. (2020) called it can be felt throughout the corporate world and across hierarchies (Bernstein et al., 2020). The ripple effects become visible in what is known in the US as "The Great Resignation" (Kane, 2021; Hempel, 2021), and in Europe as a widening of the gap of inequalities across countries, firms, and workers whose possibilities to work from home vary to a great extent (Milasi et al., 2020). The plurality of interests, demands, and needs will not allow for a one-size-fits-all solution (Kowalski & Loretto, 2017; Kossek et al., 2020). Evidence-based practices can support organisations and the workforce to build the workplace of the future, whether it be on-site, remote, or hybrid.

In the summer of 2020, we were in the midst of an experiment, and at that time, it seemed we were on the precipice of something new, something big, a shift in an old paradigm (Franzen-Waschke, 2020). Namely, the changing corporate viewpoints on employees working from home. Before 2020, often enough battles had been fought in organisations around who was given access to and could benefit from the privilege of working from home (Desilver, 2020). Then the pandemic hit, and it seemed as though sceptics – among staff as well as among corporate leaders – were prepared to admit that neither productivity nor effectiveness had suffered during the working-from-home period, and that the necessity that had once again been the mother of invention had shown that working from home does indeed work (Bartik et al., 2020; Desilver, 2020).

Since the pandemic hit employees have become experts on the remote work front. They manage Zoom and MS Teams calls, have increased their resilience towards technical challenges, and have become more understanding of each other when kids, cats, dogs, and spouses are on camera during work meetings (Singer-Velush et al., 2020). The most important thing was and remains that the job gets done, and so far, in most cases, it has gotten done!

Moving slowly and cautiously out of the pandemic, employers and staff are facing new issues and it feels like we are traveling back in time. Back to square one with a mind-set from pre-March 2020 (Mortensen & Gardner, 2021). As vaccination rates are rising, Covid-19 restrictions are loosening up, company rules and regulations are tightening again, mandating people return to their office work places in a rather harsh tone (Kelly, 2021). To the surprise and dread of some and to the joy of few. Working from home was successful as a change

initiative from the corporate point of view, as business was kept afloat and even flourished (Bernstein et al., 2020; Singer-Velush et al., 2020). From a human point of view, the success rate was not as indicative: depending on job tasks, household composition, living situations, and internet bandwidth, the transition was more or less stressful for staff, and thus the readiness to return or not to return to the workplace varies to the same extent (Anders et al., 2021; Campbell & Gavett, 2021).

Varying interests and considerations lead to more questions, and to questions to which we do not yet have any answers, or to which we do not yet have the final answers, if there are going to be any final answers at all in such a fluid and multi-dimensional environment. The experiment of 2020 continues with a different focal point. In 2020 it was **survival**, both of the individual (making a living) and of corporations (staying in business). In 2021, it will be about finding the **best way forward** to a sustainable future workplace scenario which also incorporates what was learned in 2020 (Bernstein et al., 2020; Berinato, 2020; Griffin, 2021).

Some employees enjoyed working from home more or less – depending on their personal lives and work situations. **Managers and leaders** in companies also look back in different ways: some have seen good results, productivity, and engagement at high levels; others have seen their staff suffering and longing for a way back into the office (Bernstein et al., 2020; Vogel & Breitenbroich, 2020). Managers and leaders have also seen limitations in their own spheres, e.g. their sphere of influence and control while their teams were working fully remote and from home (Rothbard, 2020). **Governments** are facing demands from organisations and trade unions to take a stance as well, and to provide a legal framework and tax policies to allow for a global masterplan to emerge (Vogel & Breitenbroich, 2020). It is still heavily debated in different countries, industries, and organisations what the best model might be going forward while also ensuring equal rights for different job types and workers. During the pandemic the gap between those types of jobs that could allow remote work and those that could not have become more apparent (Milasi et al., 2020). Those types of jobs and workers who have benefited from the change in mind-set regarding where work can be done have already decided that a hybrid model would be their preferred model, albeit they are not united about what exactly that hybrid model should look like (Milasi et al., 2020; Vogel & Breitenbroich, 2020). According to one survey conducted by Vogel and Breitenbroich (2020) employees would prefer a flexible model which allows them to work between one to three days per week in the office (Milasi et al., 2020; Vogel & Breitenbroich, 2020).

How to lead, connect with colleagues – especially new hires – and to remain engaged as a team and as individuals will change. Human Resource processes, such as on boarding and off boarding, learning and development, as well as career planning in a hybrid world will need adapting (Bernstein et al., 2020). Microsoft's 2021 Work Trend Index Annual Report "The Future of Work is Hybrid" (Anders et al., 2021) identifies seven hybrid work trends business leaders need to be aware of in 2021; those relevant for this paper are as follows:

   a)   Employees want the best of both worlds.

   b)   Leaders are out of touch with employees and need a wake-up call.

   c)   Digital overload is real and climbing.

   d)   Talent is everywhere in a hybrid working world.

Already in 2020, Smith and Garriety (2020) pointed out in their research that organisations need to become more agile and flexible in their approaches in order to cater to the different needs their employees might have if they want to remain a popular and in-demand employer of the 21st century. Truss, Delbridge, et al. (2014) found a correlation between well-being and engagement in the workforce with recognition and next-level leadership skills long before the pandemic. Hence the question is: what impact will there be on leadership, work culture, connection, and engagement with these new and diverse approaches of working together? The co-created hybrid model seems to be the most popular among the workforce, and it will be a more complex construct for organisations and leaders to make it work in a sustainable way (Bernstein et al., 2020; Globalization Partners, 2021). Autonomy and self-determination – both factors that drive motivation and performance – which would allow employees to decide how often they would like to work from home and from the office, respectively, could positively correlate with employee motivation, engagement, as well as employee performance (Manganelli et al., 2018). The extent of self-determination and autonomy, however, seems to bear challenges for some leaders, even more so when leading a hybrid workforce that can no longer be seen while at work (Mortensen, 2021). Bernstein et al. (2020) have also voiced concerns that highly-skilled workers could see a devaluation of their work when 'locked away' in a home office – so how can visibility and equality be kept in a hybrid working world?

Other factors to consider are how to ensure that leaders' trust levels are high enough towards their workforce that employees make the best decisions not just for them as individuals, but also that employees would be willing to put their entrepreneurial hats on in relation to what is best for the type of work they do, the team(s) they work with, and the customers/products they are responsible for or working with. How can leaders also ensure that the trust within the team does not erode and doubts creep in in terms of: is everyone really doing what they are supposed to be doing, namely working on job tasks to achieve project and business goals? Is everyone actually working and not chilling (Mortensen & Gardner, 2021; Campbell & Gavett, 2021)? What specific skills do leaders need in remote work environments to maintain high levels of trust and to maintain an engaged workforce that feels well at work? There is no comprehensive list of skills to check off which leaders of hybrid workplaces need to hone to make sure everyone at work feels equally appreciated and seen by their contributions, regardless of staff working on-site or working from home or anywhere. It is unlikely that a universally applicable list can be provided because matters are too complex and too pluralistic.

The author hosted a webinar in June 2021 on the topic "Entering the Hybrid World". The participants came from a variety of backgrounds as can be seen in Figure 1.

FIGURE 1. WHO IS HERE FOR THE WEBINAR
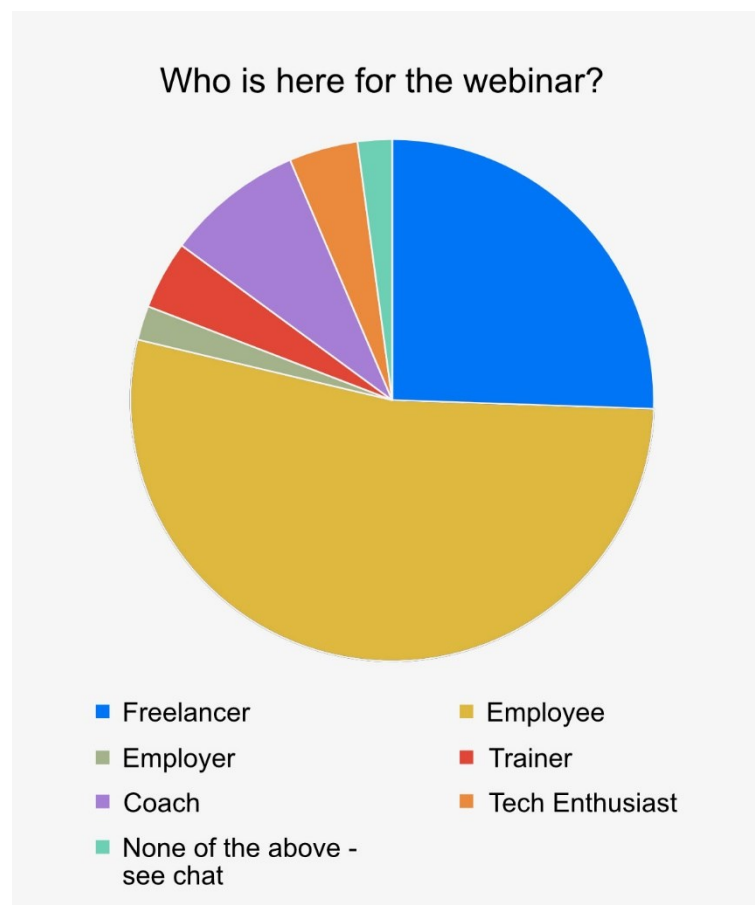
When the participants were asked in a poll about what the biggest challenges were for them in their remote workplaces, the following **top three** challenges were mentioned:
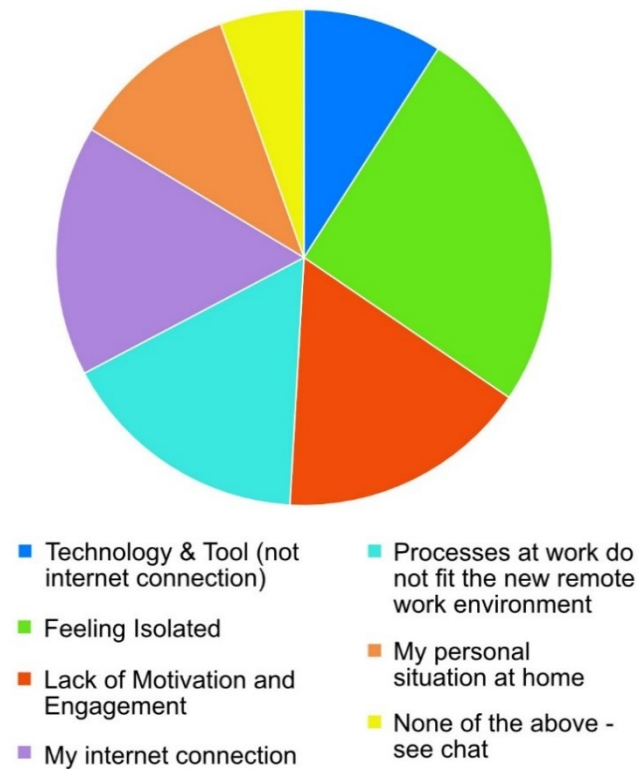
1. Feeling isolated
2. Lack of Motivation and Engagement
3. Processes are not fit for a remote environment

Figure 2 shows all the challenges participants could choose from.

What are the biggest challenges for you working remotely?

- Technology & Tool (not internet connection)
- Feeling Isolated
- Lack of Motivation and Engagement
- My internet connection
- Processes at work do not fit the new remote work environment
- My personal situation at home
- None of the above - see chat

Source: Own & Howspace, 2021

In the same webinar in a different poll, participants were also asked which skills they felt they needed to develop and build on. Figure 3 provides an overview of the skills highlighted. The top three areas for skill development were identified as follows:

1. Learn to create boundaries of my working day and my private life.
2. Learn to structure my day better.
3. Learn to lead my team remotely.

FIGURE 3. WHICH SKILLS DO YOU NEED TO DEVELOP GOING FORWARD?
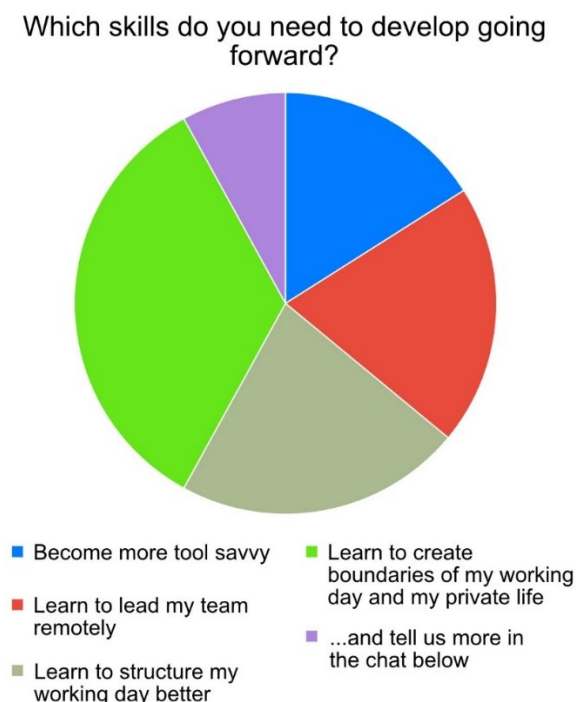
Source: Own & Howspace, 2021

Rothbard (2020) confirms that setting boundaries has been a particular challenge during the pandemic. Leaders can encourage and support the workforce in learning to create these boundaries and can lead by example. Yet, boundary setting might be a skill whose importance has grown now that the lines between work and private lives have become more blurred, and especially with Gen Z moving into the workplace as the Microsoft Workplace Trend Index Report (Anders et al., 2021) emphasises. As pre-Covid research confirms, engagement and well-being have been highly correlated with the leadership skills of the next-level supervisor (Wilmar, 2014). According to Oades et al. (2021), the lack of skills and knowledge about how to lead a remote or hybrid workforce could be compensated by an increase in literacy around well-being and engagement. O'Connor and Cavanagh (2013) say that Coaching could be one way of eliminating these shortcomings among corporate leaders.

2. Well-being & Engagement

Well-being and engagement are well-researched topics in academia (Wilmar, 2014). Litchfield et al. (2016) say that well-being is based on how every individual perceives their health, happiness, and sense of purpose. Well-being is a very subjective matter, and prone to sudden changes that are not necessarily related to the immediate work environment of the individual but could also have their origin in the individual's private environment. These influencing personal aspects of well-being make it much harder for a corporate leader to manage and work with these factors in the workplace. In view of the benefits that higher levels of well-being and engagement have for employers, regardless of the plurality and complexity of these fields, it seems to be an area worth the effort of learning more about for both emerging and seasoned leaders alike (Ladyshewsky & Taplin, 2017). The information in Table 1 was synthesized from

Arcidiacono & Di Martino (2016) and focuses in a condensed manner on what is relevant for this paper here, and at the same time, aims at highlighting the extensive research that has been done in the field of well-being. Table 1 provides a good starting point for those readers who would like to explore the various concepts in more detail at their convenience using the resources stated in the bibliography. Seligman's PERMA model (2018) was chosen to show how well-being and engagement might be connected from the perspective of the author.

TABLE 1. THEORIES AND MODELS OF WELLBEING

Model Name & Author	Dimensions
Subjective Wellbeing According to Diener (2009); Diener, Scollon & Lucas (2009)	Pleasant emotions Unpleasant emotions Global life judgement Domain satisfaction
Psychological Wellbeing According to Ryff (2014, 1989)	Self-Acceptance Environmental mastery Positive relations Purpose in life Personal growth Autonomy
PERMA Model According to Seligman (2011, 2002)	**Positive Emotions Engagement Positive Relationships Meaning Accomplishment**
Self-determination theory According to Ryan & Deci (2008, 2002)	Competence Relatedness Autonomy
Social Well-being According to Keyes (1998)	Social Actualisation Social Acceptance Social Integration Social Contribution
Happiness in Economics According to Frey & Strutzer (2010, 2002)	Pleasant Affect Unpleasant Affect Life Satisfaction Labour Market Consumerism Family and Companionship Leisure Health
The Four Qualities of Life Model and Happy-Life-Years Index According to Veenhoven (2013)	Life chances Life results Inner qualities Outer qualities
Wellness Theory and ICOPPE Model According to Prilleltensky et al. (2016); Prilleltensky (2012)	Interpersonal well-being Community well-being Occupational well-being Physical well-being Psychological well-being Economic well-being

Source: synthesised and adapted from DiMartino, Arcidiacono (& Eiroa-Orosa), own compilation, 2021

Shuck (2011) conducted an integrative literature review of the years 1990–2010 on engagement, and cited Christian and Slaughter (2007), who concluded that from an academic perspective none of the various models were more respected than the other. Furthermore, Shuck (2011) critiqued that none of the engagement models were fit for use in the corporate world. Shuck describes a disconnect between the academic view of engagement and how this view translates into practical applications for those outside of academia and he invites researchers and practitioners to continue to work on building bridges to connect these two worlds. Shuck (2011) explored in his integrative literature review the following four leading approaches by Kahn (1990), Maslach (2001), Harter et al. (2002) and Sak (2006). Table 2 provides an overview of these four leading approaches and was complemented with Bakker and Demerouti's (2001) Job-Demands-Resources Theory (JD-R) and the Utrecht Work Engagement Scale (Schaufeli et al., 2006). The JD-R Model has seen a lot of popularity in organisations. The core principles of Bakker and Demerouti's (2017) theory speak the language of the corporate world. Furthermore, the Utrecht Work Engagement Scale (UWES), a measurement tool for engagement, was developed from Bakker and Demerouti's theory and has been used in corporate environments. The JD-R theory indicates that employees who have access to the necessary resources to do their jobs, such as skills, material, and time, will experience lower levels of stress and higher levels of engagement.

TABLE 2. ENGAGEMENT THEORIES

Theory Owner	Approach & Definition of Term
Kahn, 1990	**Needs Satisfying Approach** "the simultaneous employment and expression of a person's 'preferred self' in task behaviors that promote connections to work and to others, personal presence, and active full role performances" (p. 700)
Maslach et al., 2001	**Burnout Antithesis Approach** "a persistent positive affective state . . . characterized by high levels of activation and pleasure" (p. 417)
Harter et al., 2002	**Satisfaction-engagement approach** "individual's involvement and satisfaction with as well as enthusiasm for work" (p. 417)
Sak, 2006	**Multidimensional approach** "a distinct and unique construct consisting of cognitive, emotional, and behavioral components . . . associated with individual role performance" (p. 602)
Bakker & Demerouti, 2001 Schaufeli & Bakker, 2003 Schaufeli, Bakker, Salanova (2006)	**Job-Demands-Resources** theory (see within the text above) **Utrecht Work Engagement Scale** (UWES)

Source: own compilation, 2021, based on Shuck (2011)

When layering the factors of these engagement models, especially job resources and job demands, from the JD-R theory (Bakker & Demerouti, 2001) over Seligman's (2018) well-being theory and his PERMA Model whose elements are:

1. **P**ositive Emotions
2. **E**ngagement
3. Positive **R**elationships
4. **M**eaning
5. **A**ccomplishment

One can identify overlapping elements from both fields. For example, the elements of Relationships, Engagement, and Accomplishments, which could be linked with the JD-R dimensions in terms of: colleagues I enjoy working with, material and time, that allow me to engage in my tasks, paired with the necessary skills I have to do my job. A combination of these will lead very likely to higher levels of Meaning, Accomplishments, etc. as in Seligman's PERMA model. Goodman et al. (2017) demonstrated in a study they conducted on Seligman's PERMA model, that if one element of the PERMA model is present, e.g. Engagement, the other four elements are present as well and are thus indicators for well-being in individuals. With that connection made, the question arises, if higher levels of engagement – achieved by looking at the dimensions of JD-R in combination with the five dimensions of the PERMA model – could lead to both higher levels of engagement and well-being in future workplace scenarios.

3. Coaching as one means to make contemporary workplaces more sustainable

Research conducted by Jarosz (2021) during the pandemic demonstrates that coaching enhances well-being and performance for those being coached. According to McDermott et al. (2007) and McGovern et al. (2001), who both conducted research in the field of coaching in organisations before the pandemic, they found that coaching in the workplace has become a key element of organisational learning, workplace talent management, and leadership development. Grant and Palmer (2002) also highlight that coaching does enhance well-being in personal and workplace settings. Jarosz (2021) also cites Fava et al. (2005) and Weiss et al. (2016), who showed in their research that focussing on positive psychological interventions among other interventions, successfully increase psychological well-being. Grant and Greene (2001) state that coaching is a systematic process in which coaches are guided and set their own goals and plan their actions, consequently leading to metrics for success.

In 2017 Ladyshewsky and Taplin (2017) concluded that there is considerable proof in the literature which supports the relationship between employee engagement at work and organisational performance outcomes. In their research, coaches (MBA students with work experience) received managerial coaching (by their direct managers). These managers were not specially trained coaches and their coaching skills varied and were reported as "below the midpoint." Yet they measured a significant relationship between the perceived coaching skills of the manager and the work engagement of the employee. This leads to the assumption that more engagement and well-being in future workplace scenarios can be achieved by either enhancing coaching skills in managers, or by providing professional support from a specially trained coach, or by offering a combination of both. The concept "the manager as coach" is not new and has been widely explored, for example, by Ellinger et al. (2014). It would be a separate discussion about how coaching by a direct manager is different – in particular because of the

biases and role constraints – from being coached by an external and professional coach. However, budget, time, and other factors might not always allow for an optimal solution. Therefore, looking at how leaders can use models and easy-to-use guides to enhance their coaching skills in their everyday encounters with their workforce could be a powerful first step to alleviate some of the symptoms identified during the pandemic in 2020. These symptoms or shortcomings surfaced under the extreme conditions of the pandemic but have certainly been around before and will continue to influence employee commitment to their employer as well as their work engagement and well-being in the future.

The author, as a practitioner in the field of organisational coaching, has seen that there is considerable alignment with what the previously referenced researchers have demonstrated in their various and well-respected research findings: using established and validated models of well-being and engagement, and tying these in with a systematic coaching approach and facilitated conversations between leaders and their workforce could be a first attempt to bridging what Shuck described as "…theory and research can drive practical strategies for reaching employees at differing levels of being in work (cognitive, emotional, and behavioral)". Shuck (2011) and Kowalski and Loretto (2017) invite the idea of adopting practices to best suit the specific needs of each organisation rather than copying the best practices of other organisations that might not be customised enough for different contexts, backgrounds, and industries.

4. The PPAS Maturity Model® - A Systematic Coaching Process for Leaders

Co-creating a roadmap for a successful and sustainable work culture in the 21st century would benefit both organisations and employees. Whether one starts with the implementation by establishing or re-igniting a coaching approach with leaders or managers as coaches by offering coaching to leaders and use the positive ripple effects this has into the organisations as described by O'Connor and Cavanagh (2013), or by rolling out a major coaching initiative with many different streams in an organisation, depends on where each organisation stands (status quo), where they would like to go (desired future state or goal), and their budgets.

A model that provides a simple roadmap, which can be applied with a bit of training by every leader, is the PPAS Maturity Model®. The model looks at the dimensions of:

a) **P**eople
b) **P**rocesses
c) **A**pplications
d) **S**tructure

It allows leaders and the workforce to navigate through structured conversations in a coach-like manner around personal and workplace topics. The PPAS Maturity Model® – as depicted in Figure 4 – can be used at any stage of any change initiative, to discover what is the current situation (status quo), what is the desired future stage of each dimension (goals to achieve), how those can be reached, what next steps are necessary, and it can also be used to conduct retrospectives on lessons-learned along the way. The transition to a hybrid work environment is just one example of such a change initiative. The PPAS Maturity Model® creates awareness and is fully customisable to best suit the context of the individual or the company. Kowalski and Loretto (2017) recommended more contextual approaches, less generalisations and cookie-

cutter solutions to encourage well-being in the workplace. This is what the PPAS Maturity Model® incorporates and offers.

FIGURE 4. THE PPAS MATURITY MODEL®

Exploring the dimensions People, Processes, Applications, and Structure, and how mature or well-established those dimensions are in the respective organisation or among the leaders and their workforces, could help to reduce complexity and bring clarity and structure to the necessary conversations to be held in the workplace. Each dimension is explored with what some coaches describe as discovery questions (Vogt et al., 2003; Glaser, 2014). Those questions are adapted by the coach or leader-as-coach as needed to find out what is relevant and important in the context of the enquiry.

4.1 People

The dimension of People explores what an individual or team members think about the topic of exploration, e.g. hybrid work scenarios. How much they know, what information they are missing, how they feel about the topic, in what way they think they can contribute to the topic, what skills they either bring or think they are lacking, and so forth. After the exploration of the dimension of People there is more clarity around how ready individuals are to follow the leader in the respective matter, how urgent they think the matter is from their perspective, and what needs – information, knowledge, skills, etc. – have already been met and still need to be met to continue with the initiative at hand. With the knowledge in this dimension the next steps can be planned. Often it is recommended to start with this dimension as the factor 'People' is considered highly relevant for the success of any organisational (change) initiative. The awkwardness of change and discomfort that people often experience can be addressed in this dimension which is helpful and supports the process itself (Moss Kanter, 2009).

4.2 Processes

The dimension of Processes starts in general with a process audit in which relevant processes for the topic at hand are identified, described, and reflected on by how important they are, what

is working well, what needs improvement, and what options exist to adapt or tune the process, if necessary. The identification and reflection on this dimension helps leaders to get a better understanding of the challenges and how they could be limited or eliminated when working together with the respective stakeholders. This conversation gives people a sense of importance and influence. It gives them a voice that is heard, even if it will not always be possible to change what is really needed from the point of view of the individual. This dimension speaks, for example, to "individual's involvement" as highlighted in Harter et al.'s (2002) Satisfaction-Engagement approach.

4.3 Application

The dimension of Applications also starts with an audit of all applications or tools used by the team members and how adept they are in using them, how effective the tools and applications are, and how well they match with the previous dimension of Processes. If people are required to use applications and tools, that do not work well as such, or that people (users) do not know well enough to see how those tools would support the processes they need to follow, that can cause technostress. A term that grew in importance during the pandemic and refers to stress caused among users of technical tools because the tools either do not work at all (lack of reliability), do not suit the purpose (incompatibility with job requirements), or are not user-friendly, or change too often (Bondanini et al., 2020). With these constantly changing landscapes of tools and applications in the workplace, the need to learn new things grows, and with that, people's resilience is tested (Kuntz, 2021). When exploring this dimension, leaders will learn a lot about how well job resources and employee skills converge or diverge. Knowing more about that might increase well-being on the employee side and productivity and efficiency on the company side.

4.4 Structure

The dimension of Structure looks at both the structure in the organisation and how well it serves the mission and the project or business goals, as well as, how suitable the (infra-)structures are for the employee, for example, when working from home. Does the employee have a good enough internet connection, a quiet and separated place to work from, etc.? Structure is always seen in connection with People and Processes. Clarity in what structural changes and adaptations are necessary to improve, for example, well-being or engagement help both leaders and employees. If an employee cannot work in a focused manner from home because the surroundings and family situation do not allow it, then the structures necessary for best working conditions are not given. Quite contrary, they could negatively affect well-being and cause stress for the employee (if required to work from home) and loss of productivity for the company. Engagement might also increase when structural adaptations in the workplace are made, such as, when an employee is moved from one position in the organisational chart to another, and with that the physical workplace does not change but the reporting structures do.

5. Conclusion

Well-being and engagement are complex psychological constructs and are impacted by a multitude of factors that do not only originate in the workplace but whose ripple effects can be seen there. It is undisputed that well-being and engagement have suffered during the pandemic

and that organisations are struggling to design and define the workplace of the future in which employees feel well, are engaged, and thus make a positive impact on business outcomes whether this be in the office or working from home or a mix of both. Employees have made up their minds and prefer a hybrid solution. Different views around what challenges different sectors and organisations are facing and the reported "lack of skills" among leaders and in the workforce to make the preferred hybrid solution work are calling for action. To-date, there is no accurate knowledge about what the exact skills are that leaders and the workforce are missing, and what would be the cure for many issues organisations and their workforces are facing. What we do know is that well-being and engagement have suffered. And we also know – based on research – that there are means to improve well-being and engagement in the workplace. One such means could be Coaching. Not as a remedy or a cure that promises healing once applied, but as a process that could lead to alleviation, as well as, to more clarity around the complex situations both organisations and the workforce are in. Skills and competencies to build and hone vary depending on industries and also change over time. Coaching could be one method to address this plurality of interests when it comes to deciding from where to work, as well as, to reducing or structuring the complexity around what makes people feel well and engaged in what they do – no matter from where they do it. Coaching has already proven to be a good means – for a variety of reasons – during change initiatives, and there is evidence that coaching fosters engagement and well-being in the workplace, as explored in detail in chapter 3 of this article (Grant & Green, 2001; Grant & Palmer, 2002; Jarosz, 2021). Making the workforce and their leaders fit for the workplace of the 21st century in a sustainable manner is an important topic for any organisation that wants to remain competitive. Therefore, more research needs to be done to identify the exact skill gaps that leaders and the workforce are said to have and how these relate to the challenges organisations are facing. More research is also necessary to measure the impact a coaching culture makes particularly in hybrid work environments, and how models and guides could be one way to support leaders and their workforce to choose a coach-approach more often in their everyday encounters. The author, who herself is a coach, might be biased when it comes to advocating coaching in organisations. However, the concepts of a "coaching culture" or "manager as coach", in which members of the organisation use a coaching mind-set, coaching methods and tools, do not necessarily require the paid services of external coaches and are equally considered as possibilities in this paper as the services of a professional and external coach. Furthermore, independent evidence from literature and research has been used to build the case for coaching as a resource and skill for leaders to hone and develop.

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Investigating 21st Century Skills Level Among Youth: An Empirical Study

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Abstract

Twenty-first century skills are a set of capabilities and competencies that students need to cultivate and develop to succeed in the age of information and technology. The success and growth of today's youth in the labour market and the knowledge economy depend on the level of 21st century skills they possess. Hence the key objective of this study was to answer the questions: to what extent do the youth possess 21st century skills? Is there a difference between levels of 21st century skills on account of various demographic variables? The researchers used the descriptive survey method and selected 160 college students randomly from various higher education institutions of Kerala, the southern part of India, for the study. The significant findings of this study revealed that 15.6% have a Low level, 68.1% have an Average level, 16.3% have a high level of 21st-century skills. No significant difference exists between males and females and stream of subjects of college students with respect to the level of 21st century skills, but there is a substantial difference between the youth who belong to the urban and rural locality.

Keywords: 21st century skills, partnership for 21st century skills, OECD, learning and innovation skills, digital literacy skills, life skills

1. Introduction

The twenty-first century has witnessed various developments in sciences and technology, and it has created a knowledge economy across the world. Hence there is great demand for equipping learners with the necessary skills to effectively and efficiently grapple with contemporary challenges. This century's social and economic advancements have developed new socio-economic indicators for technological advances and changes in the labour market. The 21st century is being moulded by technological progress, social changes, and the knowledge economy. In this context, the students of the present century must be able to cope up with complex jobs and responsibilities and apply their skills to their daily work (Darling-Hammond

et al., 2017). Most crucial skills like problem-solving, creativity, critical thinking, and digital literacy skills are essential for the economic development of any nation today (Osman, Soh, & Arsad, 2010). In this scenario, there is a pressing demand for new sets of skills which the youth are expected to be competent in. Luna Scott (2015) clearly outlines these new sets of skills: knowledge, attitudes, and abilities compulsory for competitiveness in the corporate sector, catalysts for changing society, managing changes in the workplace, and applying innovative technologies. In the coming years, especially in the post-COVID-19 period, the expectations of the workplace from the fresher's will be different from that of the previous century. Hence, educational institutions, especially at the tertiary level, have the responsibility to inculcate skills and competencies needed for the twenty-first century in their students, which are expected from the workplace (Oretta, 2012). It has been observed that there is an incongruence between present-day teaching in schools and the skills and knowledge required for societal development, which divide has created a 'global achievement gap' that leads to learners who are unprepared for the present age (Wagner, 2014).

The concept of 21st century skills is not a new one but has become increasingly relevant over time (Silva, 2009; Rotterham & Willingham, 2010). There are many studies on 21st century skills across the globe that suggest the way and method to integrate them into the education of the youth (Yost, Sentner, & Forlenza-Bailey, 2000). 21st century skills are equally important and relevant for teachers and learners of this age; therefore, the curriculum designed for learners need to be transformed so that these transformative skills of the century can be successfully transmitted to them. Educational institutions should be organized in light of these skills. Hence, this study would help determine the spaces and areas that need to be stressed in preparing the youth of today.

1.1 What are 21st Century Skills?

Among the various organizations and frameworks, Partnership for 21st Century Learning (P21) & the Organization for Economic Co-operation and Development (OECD) have acted as catalysers in a joint effort between educators, companies, and governments, and have contributes in enhancing 21st century skills among various stakeholders especially among the youth and teachers. The skills and competencies of higher education students need to be improved in their careers and personal lives and these are determined by mutual collaboration among various stakeholders (Johnson, 2009). This necessitates the need to integrate the 21st century learning competencies in the curriculum at all levels. The P21 framework identifies core twenty-first-century themes, such as standards and assessments, curriculum and instruction, professional and learning development, and three types of skills essential for the twenty-first century, as shown in Figure 1 (Trilling & Fadel, 2009). Figure 1 displays the core skills recommended for students to acquire in the twenty-first century: life and career skills, learning and innovation skills, and information, media, and technology skills. Each of these three core skills focuses on specific domains considered necessary for twenty-first-century life.

a) Learning and Innovation Skills consist of engaging in critical, creative, and innovative thinking and communication and collaboration with others (Trilling & Fadel, 2009). These skills are essential for those involved in more and more complex life and work. These skills essentially prepare the learners for the future (Kay & Greenhil, 2011).

b) Digital Literacy Skills include three components like information, media, and technology skills. Information literacy is considered as the ability to access, locate, and

evaluate information effectively (American Library Association, 1989). Media literacy points out the ability to analyse, produce, and evaluate print and electronic media (Kubey, 1997). Technology literacy refers to applying and using digital/ICT tools and creating information (Trilling & Fadel, 2009; Kay & Greenhil, 2011, van Laar et al., 2017).

c) Life and Career Skills consist of abilities that make one flexible, adaptable, help one have socio-multi cultural interactions, be accountable and productive, etc. (Trilling & Fadel, 2009; P21, 2015).

FIGURE 1. P21 FRAMEWORK
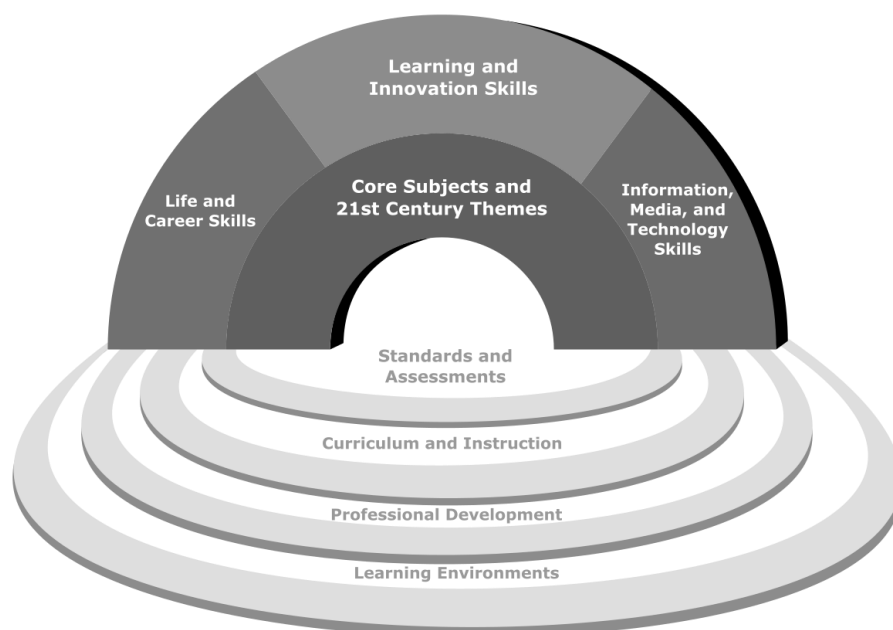
Source: P21, 2006

1.2 Youth and 21st century skills

The hopes and expectations of a population lie on the youth to create a sustainable, equitable, and prosperous nation. To affirm this fact, the Kothari Commission (1964) opens its report by stating, "the future of India is being shaped in her classrooms." It is estimated that the world has about 1.8 billion young people in the age group of 15 to 29 years, India has the world's most prominent young population of 356 million in the age group of 10 to 24 years, followed by China with 269 million young people. By 2020 India became the youngest country with a median age of 29 years (Rajiv Gandhi National Institute of Youth Development, 2017). To make use of this demographic dividend, they must be moulded and shaped according to the situations of the modern age by enhancing the capabilities and expectations of young people. Empowering the youth necessitates not only mere providing education but also quality learning which can enhance skill development. Evidence from various research highlights those countries which are now restructuring the teachers' education standards, curriculum, assessment, teaching methods, and career development to integrate 21st century skills into the education system (Bellanca & Brandt, 2010). This is all for developing a generation who can

manage the socio, economic, and cultural situations of the age in which they live. Hence learners are expected to think and learn, solve problems, communicate and collaborate by applying 21st century skills such as critical thinking, creativity, and problem-solving (Kay, 2010). These are the various competencies needed for today's youth, and it is essential to make vital changes in education systems (Dede, 2010; Voogt & Roblin, 2012). Any curricular reformation must first ensure the status and level of the learners so that the integration of 21st century skills may be incorporated into all levels of education. Hence the objective of the study is to analyse and examine the levels of 21st century skills among the youth.

1.3 The rationale for the study

21st century skills are essential skills and competencies for successful accomplishments in the personal and professional life of today's young people (Ledward & Hirata, 2011). These primarily involve higher-order skills like creativity, critical thinking and problem solving, and competencies related to information and communication technologies (ICT) as well as skills like collaboration, leadership, sociability, flexibility, and productivity which were also important in the previous century as well (Pellegrino & Hilton, 2012; P21, 2015). These skills are regarded as significant by all the stakeholders of education. Few of these skills could be found in practice in the majority of people even at the turn of the century. Still, digital literacy skills are the result of advancements in science and technology. Hence, mere factual knowledge of these skills would not be sufficient enough, rather the specialization of these skills through theory and practice is required (Greiff, Niepel & Wüstenberg, 2015).

The related literature of 21st-century skills comprises several frameworks and organizations established worldwide (Tan, Chua, & Goh, 2015) like the OECD, Framework for twenty-first-Century Skills (P21, 2015), and enGauge (NCREL-METIRI Group). The commonality among these frameworks is the emphasis on the competencies essential for contemporary learners (Tan et al., 2015). The vital highlights of these frameworks would suggest a solid agreement on the need for competencies in various activities like the communication process, collaborative enterprises, application of ICT, and multicultural awareness and understanding in all spheres of life. Creativity, critical thinking, problem-solving, and productivity skills are also considered as important (Voogt & Roblin, 2012). Hence it is very essential to equip the present-day youth with 21st-century skills. Therefore, this study was oriented to assess their level of 21st century skills.

1.4 Objectives of the Study

a) To ascertain the level of 21st century skills among college students.

b) To find the difference between various demographic variables (gender, stream of study, locale) and 21st century skills.

1.5 Hypothesis

1. H_1- There is a significant difference in the mean scores of the level of 21st century skills of college students with respect to gender at 0.05 level of significance.

2. H_2- There is a significant difference in the mean scores of the level of 21st century skills of college students with respect to locale at 0.05 level of significance.

3. H_3- There is a significant difference in the mean scores of the level of 21st century skills of college students with respect to stream of subject at 0.05 level of significance.

2. Methodology

The present study is based on the survey method.

2.1 Sample and Sampling Technique

All the college students (UG level) in Kerala (India) are included as the population of this study. Four Colleges of Kerala were randomly selected. The researcher chose 160 students (Male 68; Female 92; Rural 93; Urban 67, students from science stream 66 and from Arts stream 94) randomly and collected the data using a questionnaire on 21st century skills.

2.2 The tool used for the Study

The Twenty-First Century Skills Scale was constructed and standardized by the researchers for assessing the level of 21st century skills among the college students of the study. There were 50 items, and each of the items has some alternative answers. Cronbach's alpha reliability of scale was established as 0.88 and the scale has undergone a face and content validity process by experts. The Likert Five-point scale measure ranged from Strongly Agree-5, Agree-4, Neutral-3, Disagree-2, and Strongly Disagree-1. A value of 1 to 5 is assigned for each answer and then the total score is compared to a key to determine the level of 21st century skills. The scores of arithmetic mean and standard deviation of scores obtained from the results of the 21st Century Skills Scale were 191.53 and 16.76. Norms for the scale were set as Low, Average, and High by taking into consideration scores less than -1SD (174.77) as Low and the scores more than +1 SD (208.06) as High. The scores between -1 SD to +1SD (between 174.77-208.06) are considered to be Average.

3. Results

The first objective of the study was to identify the existing level of 21st century skills among the youth. Table 1 shows that out of 160 college students, 25 students (15.6%) have a Low level, 109 college students (68.1%) have an Average level, and 26 students (16.3%) have a High level of 21st century skills.

TABLE 1. LEVELS OF 21ST CENTURY SKILLS AMONG COLLEGE STUDENTS (FREQUENCY AND PERCENTAGE)

Variable	Low	Average	High
Twenty-First Century Skills	25 15.6%	109 68.1%	26 16.3%

Source: current research

It can also be seen that the maximum percentage of students (68.1%) have an average level of 21st century skills. This can be interpreted as most college students do possess a moderate/average level of the skills essential for the 21st century.

The mean scores of 21st century skills, as depicted in Table 2, for male students is 18.45 (S.D=8.70) and for female students is 17.35 (S.D=8.37) respectively.

TABLE 2. SIGNIFICANCE OF DIFFERENCE BETWEEN VARIABLES

Pair of Comparison	N	Mean	SD	SED	df	't' Value	Remark
Male	68	18.45	8.70	1.05		0.80	NS#
Female	92	17.35	8.37	0.87			
Rural	93	19.25	8.43	0.87	158	2.55	S*
Urban	67	15.83	8.26	1.00			
Science	66	17.72	8.29	1.02		0.12	NS#
Arts	94	17.89	8.70	0.89			
Significant at 0.05 level, # Not significant at 0.05 level.							

From Table 2, it can be observed that the calculated t value (0.80) is smaller than the table value (2.61 at 0.01 level & 1.98 at 0.05 level), which leads to the understanding that the difference between the two groups (Male and Female) is not significant at 0.05 levels. Hence, H_1 is rejected, that is to say that there is no significant difference between male and female college students regarding the level of 21st century skills. The mean scores of the level of 21st century skills for rural college students are 19.25 (S.D=8.43) and for urban college students is 15.83 (S.D=8.26) respectively. Here the calculated t value (2.55) is greater than the table value (1.98 at 0.05 level). That is to say that the difference between the two groups (Rural and Urban) is significant at a 0.05 level of significance. Hence, H_2 is accepted at the 0.05 level; that is to say that there is a significant difference between Rural and Urban College students regarding their levels of 21st century skill. The mean scores of the level of 21st century skills for science students is 17.72 (S.D=8.29) and for art students is 17.89 (S.D=8.70) respectively. The calculated 't' value (0.12) is smaller than the table value (2.61 at 0.01 level & 1.98 at 0.05 level). That is to say that the difference between the two groups (Science and Arts) is not significant at 0.05 and 0.01 level of significance, and H_3 is rejected. Thus, there is no significant difference between science and art students regarding the possession of 21st century skills.

4. Discussion

The present study aimed to investigate the levels of 21st century skills among the youth, and the significant findings of this study reveal that 15.6% have a Low level, 68.1% have an Average level, 16.3% have a High level. No significant difference exists between male and female and stream of subjects of college students with regard to the level of 21st century skills, but there is a significant difference between the youth who belong to urban and rural localities. Compared to other studies, the results of the present study show some familiarities and inconsistencies in the findings. The study conducted by Fong, Sidhu & Fook, (2014) has a similar kind of result where postgraduate students were observed to have average critical and creative thinking, communication and English language skills, and low entrepreneurial skills. The studies conducted by Yenice (2011) on critical thinking dispositions, Tican & Deniz, (2019) on collaboration and flexibility resulted in proving female learners as having more collaboration and flexibility skills than males, but this result is inconsistent with the result of Zayıf (2008), Çetinkaya (2011), Yorganci (2016) where scores of male candidates were significantly more significant than the scores of females. The study conducted by Yesilyurt (2010) viewed that there is no gender-based difference between the teacher-students. This study

also found that there is no significant difference in the scores of 21st century skills based on gender.

5. Conclusion

21st century skills are essential for 21st-century learners, and therefore the education system must be designed in such a way as to effectively teach these skills to the young people. The results of the present study help to determine the focus areas which should be emphasized in the learning programmes of the youth. The present study reveals that the level of 21st century skills among the youth is average, whereas it should to be at a superior or high level. In this context, it is essential to prepare policies and integrate these skills into the curriculum to develop transformative competencies for the future. Another aim of this study is to encourage future research to be carried out to understand the measures and techniques to enhance 21st century skills. The educationists and curriculum constructors should conduct serious research to develop various strategies and learning packages which can be incorporated in higher education and teacher education curricula.

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