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PROJECT BASED LEARNING STRENGTHEN THE CONFIDENCE IN OWN CAPABILITIES

Abstract:

The last three years have been very special for everyone, but the Western World in particular has come from a reasonably stable structure unprepared into an unpredictable situation. Central Europe especially has been in constant economic growth since World War II and the German Reunification. Therefore, this paper will focus primarily on the young people in this living space, which are experiencing great instability due to the Covid-19 pandemic and the Ukraine war. This study focuses on school leavers who graduated in 2021/2022 during the pandemic. Through the evaluation of case studies and accompanying questionnaires, it will be shown how learning methods could be adapted to address social peculiarities and to pick up the Covid-Generation. Characteristics of this generation, so called Generation-Z are challenged and specifically for the identified sub-group additional evaluations are required. Reviewing the studies of the impact of the pandemic, specific support and awareness is needed to prepare them for their next step starting a job, an apprenticeship or a field of study. Clear reflection of the gained strength and weaknesses helps to evaluate the learning and social capabilities and prepare them for lifelong learning (cf. Andresen et al., 2022, p.11ff).

The question is rising; 'How to enable current students with expertise and related self-confidence?' Reflecting the changes after the Covid-19 pandemic and its impact and the challenges in a digital, fast rising business environment. Focusing on the students finishing high school during the pandemic, struggling with self-confidence unable to finalise something or starting something new. Especially when it comes to choosing a career and further education, many are disoriented.

The paper aims to provide a clear view, that current educational institutions have to adapt much faster to support young people desperately seeking for orientation. It will provide some examples what Education 4.0 could look like. Questionnaires have been executed at two case studies as qualitative research methods and some trends have been analysed taking the feedback and literature research.

Taking the very positive development of digitalisation in education, many possibilities on online, blended or hybrid learning into a reflection of requirements of the business world which had to change in parallel. In addition, students which desperately wanted to be back in the classroom challenged the setting there to fill social gaps from the previous years. Projects and case studies been very successful to increase confidence in student capabilities.

Keywords:

Life-long Learning, Higher Education, Education 4.0, Covid-19, Learning Methods, Project Based Learning, Self-paced Learning

JEL Classification: A20, D83, I29

1. Introduction and Relevance

The last three years have been very special for everyone, but the Western World in particular has come from a reasonably stable structure unprepared into an unpredictable situation. Central Europe especially has been in constant economic growth since World War II and the German Reunification. Therefore, this paper will focus primarily on the young people in this living space, which are experiencing great instability due to the Covid-19 pandemic and the Ukraine war. This study focuses on school leavers who graduated in 2021/2022 during the pandemic. Through the evaluation of case studies and accompanying questionnaires, it will be shown how learning methods could be adapted to address social peculiarities and to pick up the Covid-Generation. Characteristics of this generation, so called Generation-Z are challenged and specifically for the identified sub-group additional evaluations are required. Reviewing the studies of the impact of the pandemic, specific support and awareness is needed to prepare them for their next step starting a job, an apprenticeship or a field of study. Clear reflection of the gained strength and weaknesses helps to evaluate the learning and social capabilities and prepare them for lifelong learning (cf. Andresen et al., 2022, p.11ff).

The main aim of this paper is to invest in the education of the current adolescents, to realize and support them to be prepared for future jobs. What was the impact of graduating during the pandemic Covid-19 on their personal development and moving towards a difficult economic situation with high inflation, energy crisis and the Ukraine war in Europe. How is this generation been socialized and besides the motivation factors, the question remains about their priorities and possibility to continue the education? In the end the adolescent need to decide what to do next and the prospects are enormous (cf. Großegger, 2022, p. 3f). But many of them do not accept the challenge and feel ready for it. Many of the young people are lacking self-confidence in order to proceed with any task. This Generation finalized their main education during the pandemic being behind a screen, mostly with the camera switched off. This didn't challenge the personality neither in the peer group nor in front of other role models.

Given with the digitalisation transformation and a lot of constantly changing working environments the persons need to be able to adapt and be prepared for life long learning. This generation can not be lost, it needs to be analysed how to bring them back to a stable learning environment where all the new content appears not too scary (cf. Hafsted et al., 2021, p. 640f).

The overall **key research question** for this paper is:

'How to enable current students with expertise and related self-confidence?

Supporting these question hypotheses have been defined which will be evaluated in a literature research and facilitated by questionnaires as a qualitative research method.

Limitations: Geographically this research is limited to Western Europe especially to the southern part of Germany, Bavaria and Tirol in Austria. While the literature research focus on Europe the interviews focus on the experience of adolescents mainly in the Austrian and Bavarian area, where the young people finalized school during the pandemic Covid-19 and now started their studies. Due

to the actuality of the topic the research considers mainly the last five years taking the timeframe of the pandemic- Covid-19 into account.

2. Terms and Definitions

Key terms are clearly stated and defined for the purpose of this paper. Sometimes notions are used differently therefore this chapter should avoid confusions.

Pandemic COVID-19; the Coronavirus disease 2019 also known as Coronavirus or COVID-19 is a disease which is caused by the coronavirus (SARS-CoV-2). It is a highly contagious infection, where mainly elderly and sick people had firstly a bad progression given there is no cure and medication. The different vaccines were developed and at the market mid-2021. Due to the high infection rate people had to remain in quarantine; schools and businesses shut down for many weeks. Therefore, adolescents haven't been educated remotely. In Germany and Austria there have been four waves where, with different rules and situations schools have been shut. Persons have been educated remotely or just been given work packages. Specifically, during the first wave a hard lock down was executed and people couldn't go out and meet at all, which was a huge impact especially for adolescences which should and wanted to differentiate from their parents (cf. Van der Vorst, 2022, p.3).

Generation-Z; born between 1997 and 2012, these generation had been called the digital natives first, growing up with internet and social media. Following the Generation-Y – the millennials – which been the first young people growing up with mobile devices and the internet being born between the 1980 and 1996. While the Generation-Y was called very lazy and seen as focusing on work-life balance, the Generation-Z is called the lost generation. The impact of the lock downs for month and multiple periods of time during the Pandemic had consequences for all people but hit very hard the adolescents being at their final years at school at the time. While generations before learned, had crisis, partied and then had a great perspective on the future, everything was very limited for these, with an un-estimable impact. Given there was not experience of the potential role models on this situation an overall insecurity rises (cf. Hafsted, et al., 2021).

Education 4.0, the educational approach always followed the industrial approach in the past. The term "4.0" was founded originally related to the industry, but the requirements for this new educational system need to consider so much more. Firstly, as mentioned the use of the Internet of Things, Services and Networks (IoT) was one new impact but next to new technology been taught methods, tools and structures have been adapted. (cf. Silva, et al., 2022). In addition, the entire environment and social structure changed. The Generation-Z will bring more online and hybrid learning experience but less personal interaction supporting classroom training. For the future the requirements of skills, teaching professions and expectations from the industry need to be mapped in the education program.

Project-based Learning, as part of important teaching practices project-based learning gained more importance especially after the pandemic. Teaching methods have been challenged during

the pandemic given the switch to remote and digital teaching. Back to more interactive and class room training experimental, practical approaches and case studies are an important part of teaching (cf. Umar, et al., 2022).

3. Research Question and Method

This research was founded on the basis of many years working in the education sector, experiencing the various lock downs and all the spontaneous executions of various teaching methods. A lot of literature and studies have been evaluated in the last two years to interpret the new teaching methods. Due to the pandemic Covid-19, a lot of schools and universities gained a technological boost on infrastructure, sometimes paired with some advanced training but not in consistence with the mental development of young people.

Questionnaires have been executed with students in a laboratory and teaching environment. Evaluating the specific situation. The geographical limitation for the empirical part of this research is to Austria and central Europe given the home countries of the participants.

The overall **key research question** for this paper are:

‘How to enable current students with expertise and related self-confidence?’

H1: The adolescents of Generation-Z do have other learning track-record as other generations before. They are missing practical training and have little experience to evaluate their expertise, therefore they are lacking self-confidence by using new skills.

H2: Due to the pandemic, interaction with unknown and well-known adults was very limited and the exchange took place within the comfort zone. Therefore, they withdraw and avoid situations where the people and content are new.

After a very high disruption in business due to the technological development, digital transformation and globalization the pandemic Covid-19 and the related lock downs changed the game. Constant remote work, remote teaching and an enormous use of online tools increased the abilities of the working, teaching and learning people in an unforeseen fast period of time. It remains uncertain how businesses will continue but for sure not all of the social skills which have been required for years before Covid-19 will disappear all of a sudden. So, the gained digital skills will fully be supported by the companies as well as personal interaction. Therefore, the Generation-Z need to gentility be introduced to personal interaction as well as new business models will be developed. (cf. Swinkels, et al., 2021).

In the near future, people have to change jobs, or better the content of the current jobs will change significantly. The request on skills may differ as well as the possibilities in the learning and teaching environment (cf. Lund et al., 2021).

4. Generation-Z transferring knowledge to professional life

The current generation of school leavers and students, being in their first semesters, all have one thing in common; after a stable school period, they were pushed into an examination phase, under Corona, with unforeseeable conditions and rules. Not prepared for long lock-down phases, behind screens and in a very strong phase of personal responsibility. All role models failed at first and they had to rely more than ever on the inner circle of the family, which has strong consequences in a section of usually getting independent. Summarizing the 2022 Youth Study, it is distinct that the perceived burden is clearly present at 80% of adolescents. The orientation is explicitly directed inwards, the family, the closest circle of friends, with a focus on health, sports and nature. Even though it is often emphasized that they are not and do not want to be a "lost generation", the effects of the pandemic are evident in many places. Especially when dealing with larger groups of people, "social anxiety" has become an important term (cf. Großegger, 2022).

The 2021 study showed that 65% of students prefer classroom teaching, 29% prefer mixed teaching and only 6% want virtual teaching (cf. Van der Vorst, 2021, p.13). The same survey in spring 2023 clearly shows that 82% prefer face-to-face teaching. More and more students want to return to the old "normality".

What we have learned – presenting oneself online, continuing one's education and mastering the technology – has become an integral part of working life. Working models will be adapted and a mixture of the possibilities will be the future. While working remotely only accounts for 5%, models with pure presence are 30% (cf. n.a. Littler, 2022, p. 4f). During the pandemic in 2020-2022, it was thought that full digitization of training areas would be possible very quickly. But the technical and infrastructural implementation was only one part. Young people spend a large part of their time outside of school education, with sports and music, with organizing in small groups and networks. It was only in retrospect that it became clear that far too large an area had disappeared that was significantly involved in the development of adolescents (cf. Andresen, 2020, p. 12f). The same study 2 years later clearly shows that the pandemic has caused an unsafe way of dealing with people and one's own skills. 43% of the approximately 6160 young people surveyed stated that they had become very insecure in social contacts. Worries and fears about the future also manifest themselves, which was confirmed by 54% of respondents. Additional burdens due to Corona and an extension of studies were assumed by about 50% of the respondents (cf. Andresen, 2022, p. 15).

The hypotheses can be clearly confirmed. As much as young people appreciate and apply new digital learning techniques, there are clear gaps in their dealings with superiors, teachers or other people. It is necessary to show a "confidence gap" in terms of social interaction not so much technical depth, and, above all, the practical implementation of what has been learned to every day's work.

5. Empirical part; Case Study and Laboratory Experiment supported by questionnaires

Teaching and working with students fitting in the exact group of young people of this specific Generation-Z there was the possibility to execute a case study and an experiment followed by a set of questions. The group of students been diverse being just German and Austrian based as well as a group of international students mainly from central Europe.

5.1 Executing practical case studies with an evaluation of the gained confidence

In the university of applied science for the period of one semester a class of international students has been given lectures to prepare for external projects. Given the situation to work with external partners is specifically in an international business a very new situation for young professionals, so the students felt very uncertain. The aim was that at the end of the course the students should feel very well prepared and confident to execute a full external project.

During the course of the 10 weeks for every new topic the students were given a theoretical part of the topic and a related case study, on which they had to work in teams and present in the save environment in front of the classmates.

It was a class of 28 international students. 5 been under 20 years old and 23 between 20 and 25 years old. The group consisted of 17 female and 11 male persons. They all finalized their high school during the lock down period with various circumstances. If they could choose they feel better taking part of a classroom training. Only 5 still prefer online training. If they would have to take online training it should be real time according to 18 students. The rest like training with remote videos and self-studies. 85% of the students favor the combination of group case studies best. Not only liking it but felt very good prepared and more confident in the content to use it in the field.

Results:

An anonymous questionnaire had been executed to the 28 students and the questions been answered as follows.

Q8) How do you like the mixture of theory and case studies? (Where 1 is not liked and 5 most liked)

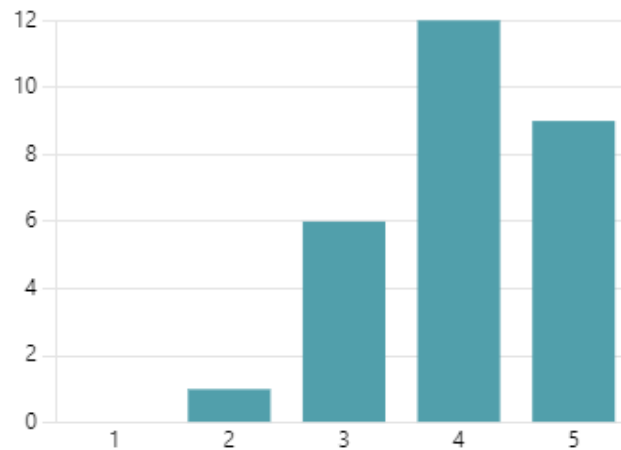


Figure 1: Teaching questionnaire: Mixed methods, created by author 2023

As Figure 1 shows, the majority of the 28 students liked the combination of theoretical lectures immediately followed by some practical case studies.

Therefore, the next question about the preparation and confidence been asked.

Q9) Do you feel good prepared / confident for your assignment doing the overall case study? (Again 1 is not – 5 is very good)

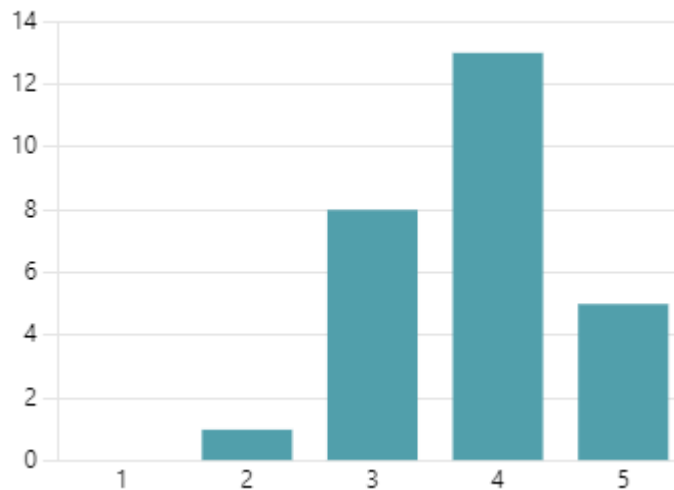


Figure 2: Teaching questionnaire: Confidence, created by author 2023

As Figure 2 shows most of the students felt very well prepared and confident to take the theoretical expertise with the executed case studies into the working environment. They stated that related cases and tools prepared them to remember and use new knowledge and expertise in the future.

So, in summary 65% of the students felt more confident after the practical case studies to perform the overall assignment. They even wished for online theory lectures to prepare and spend more time on practical cases and projects in class.

5.2 Practical lecture in the laboratory to train cases and an evaluation with a control group

An experiment had been executed with regular students in a laboratory environment. The students had to do a technical process where most of the participants have been very uncertain of and unsure if they could do so. The group contained 12 men and 8 women which had been equally be assigned to the treatment group and the control group. Most of the persons been between 20-25 years old. Each team had 3 out of the 10 persons which had some experience and technical background.

The setting was a laboratory setting of a Lean Lab Production Factory. The factory has multiple workstations to produce a small table watch. The focus for this study was on the bending process. So, a workstation which had been set up with a bending unit to bend 2 different metal plates. The groups were equally split into a team of 10 persons for the treatment and control group. Equally in terms of gender, technical background and age. None of the participants had done this bending process at the laboratory workstation before. Metal part A consisted of two bends, part B of one bend. The tasks consisted of fixation of the metal sheet, adjusting the bending angle, bending and removal. All persons had an introduction to safety.

Both teams did get a verbal description of the work place and the process. In addition, the treatment group had a detailed training regarding the bending process using a full VR process introduction (cf. Schmiedinger et al, 2023, p.).

Results:

A questionnaire had been executed to both teams. After all demographic data both teams had been asked about their own satisfaction with their performance. 40% of the VR trained group felt satisfied with their own performance versus 20% of the untrained control group.

Asking how the persons experienced the setting and work executed, the trained group didn't feel tensed during the execution, while 90% of the untrained control group felt tensed (see Figure 3). So even just in doing and executing a new process a first project training provides the participants a much better start.

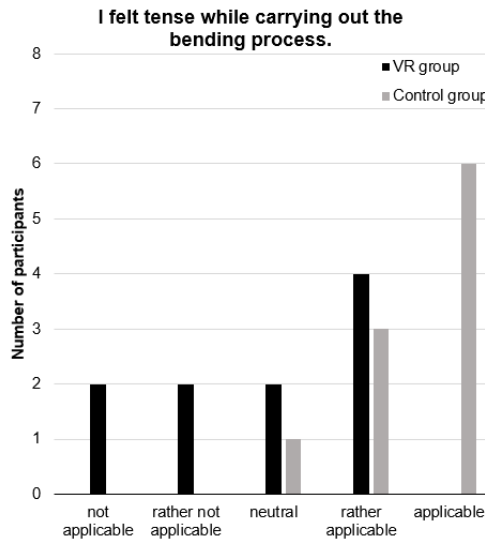


Figure 3: VR questionnaire: Self Assessment – Tense, created by author 2023

In the same executed questionnaire, the persons of both teams been asked about their confidence and feeling for process complexity. 50% of the trained group felt confidence in execution of the process versus just 10% of the untrained peer. The operating knowledge was different as well, 20% of the trained persons tracked the process as rather complex versus 40% of the untrained.

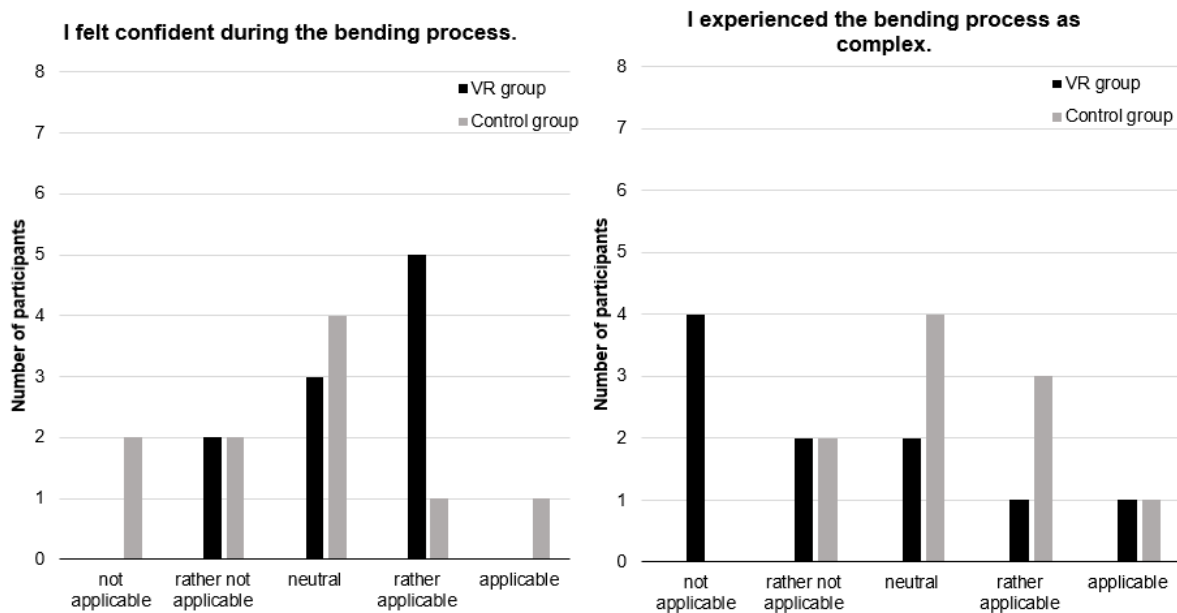


Figure 4: VR questionnaire: Self Assessment – Confidence and complexity, created by author 2023

The participants of the VR trained group felt higher confidence in their own ability, while feeling better prepared, feeling less tense and having a higher personal satisfaction.

6. Conclusion and Next Steps

This paper examined the challenges for the Generation-Z people finalizing their high school during the pandemic with all the forces and possibilities working in the industry in the future.

Some very recent studies and statistics were evaluated and both the changes in daily learning and teaching as well as in the development of this particular generation were discussed. Scientific articles sometimes reference to the "lost generation" that has grown up in a very strong, unstable environment, has the fears of the future transferred and lost faith in their role models. This, the digital generation, which presume to solve everything and has a lot of access to new technologies and networks, supposedly fails because of social interactions. Self-confidence, communication and new fields of work tend to be a deterrent. "Social anxiety" is a serious buzzword.

The results for the overall **key research question** in this paper are:

‘How to enable current students with expertise and related self-confidence?’

The question has been examined with two hypotheses, which took actual literature and surveys into account. Both could be positively confirmed. The missing practical training and social interaction leads to social anxiety and lacking self-confidence.

A case study supported by a detailed questionnaire verified that experiencing new technologies and knowledge in a safe environment like a practical university case study leads to more self-confidence using these skills in a business environment.

The laboratory experiment using very new technology – a VR training environment – supported the result. A control group had been established which approved the additional confidence gained during the trials in a safe environment.

All in all, the Generation-Z has a lot of experience, passion and ambition. They are definitely not a lost Generation but their expertise gained during Corona need to be leveraged in a positive way given them the safe environment to be able to learn further and develop more self-confidence.

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