

Education 4.0. Between Generation Z and Industry 4.0 needs

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Abstract

The objective of the paper is to briefly find a connections or disconnection between Generation Z needs and wishes and Industry 4.0 needs from its specialists based on Education 4.0 implementations. The method used is secondary qualitative analysis, from information selected from information and hypothesis elaborated by the most known sources in terms of validity and recognition. The findings reveal nine trend that could be added to education principles to develop a just and self-sustaining form for education instead of knowledge. In conclusion we found that the Generation Z has a high expertise of Technology use that can be an advantage for organizations that embrace new technologies. Also, Generation Z needs flexible working hours, a minimum independence and autonomy and an encouraging working environment.

Key words: Generation Z, Industry 4.0, Education 4.0, technology

J.E.L. classification: I26

1. Introduction

In January 2016 World Economic Forum’s (WEF) “Global Challenge Insight Report” said that “By one popular estimate 65% of children entering primary schools today will ultimately work in new job types and functions that currently don’t yet exist.” (Forum, 2016).

In January 2017 McKinsey Global Institute (MGI) stipulated that “49 percent of the activities that people are paid to do in the global economy have the potential to be automated by adapting currently demonstrated technology. While less than 5 percent of occupations can be fully automated, about 60 percent have at least 30 percent of activities that can technically be automated” (Manyika, 2017). Also, they showed that “At a global level, technically automatable activities touch the equivalent of 1.1 billion employees and \$15.8 trillion in wages”.

In April 2018 another news to implementation of machines said that “80% of the skills trained for in the last 50 years can now be outperformed by machines” said (Brianna, 2018).

All this information gave the impression that the human will be replaced by machines. Yet,

The importance of the present research paper emerges from giving a perspective about the education 4.0 and how it would be transformed for the preparation of new generations in using the new technologies like AI, Chat-GPT, Bard, etc. Their results can sketch how the Education 4.0 should be designed for Gen Z and a base for Gen Alpha.

2. Literature review

There are three variables that we take we consider in the present paper: Generation Z, Industry 4.0, and Education 4.0. There is a great deal about all the three, so we try to cover, according to the research methodology, the most valid and known sources of information and data.

Generation Z

The vision of Pew Research Center about Generation Z defines them as the people that were born in years between 1997 ÷ 2012, so in between 11 and 26 years old now. As one can see the higher age of them is reaching 26 years, and consist in numerous college graduates, married, or/and starting families. They trail the millennials generation that were born between years 1981÷1996. As a result of the COVID-19 pandemic, the uncertainty of war in East Europe, Gen Zers meet a future farther ambiguous than most generations before it (Parker & Igielnik, 2020).

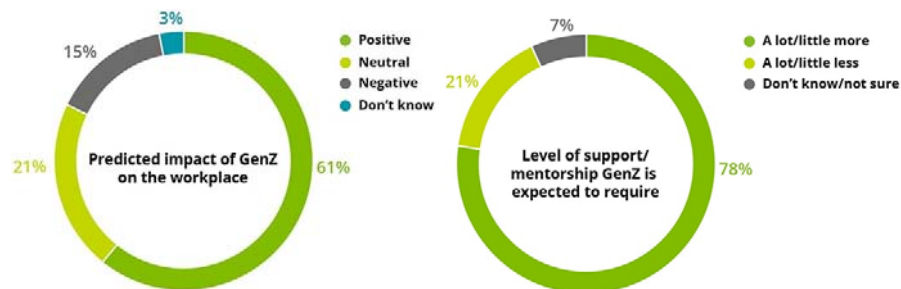
Add all the above with the fact that members of Generation Z are the first generation that understand and interact with the world mostly through the internet. Also, they grew, develop, and learn always using digital tools, making it the most diverse generation yet. As Gen Z turns into adults and enter the workforce, what do we really know about them? (Katz, Ogilvie, Shaw, & Woodhead, 2021)

Millennials asked what advice they can pass the next generation from their own early careers' experiences, the core directions to apply were (Deloitte, 2017):

- Learn everything you can: Start your first days as an employee with an open-mind and behave by learning, as much as you can from others.
- Work relentlessly: Make the best job you can and do not be slothful.
- Be patient: Walk step-by-step through the evolution of workforce.
- Be devoted: Continuously aim to succeed and persist.
- Be ready to adapt: Be open and flexible to adjust and attempt new things.

Considering the diversity met in different country, due to culture or level of training, millennials have various advice for GenZ: in China, GenZ should be “humble;” in South America, it should “be ready to learn;”, in the US and Canada, the advice is to “work hard.”

Figure no.1. Generation Z and predicted impact on workplace.



Source: <https://www2.deloitte.com/ro/ro/pages/about-deloitte/articles/millennial-survey-generation-z-welcomed.html>

Further, Millennials think that GenZ must mainly learn softer skills, before technical or specific knowledge, to achieve their goals. Millennials in management situations (those implicated in decisions on strategy and path) consider GenZ to be undertrained in terms of expertise and personal attributes such as endurance, responsibility, and integrity (De Witte, 2022).

In research developed by (De Witte, 2022) which implied 120 interviews, recorded from 3 university campuses – Stanford University; Foothill College (community university in Los Altos Hills, California); and Lancaster University (research university in Lancaster, England) (sampled of more than 2,000 adults with age between 18 and 25 years old), some of the most interesting find were:

- Gen Zers are self-reliant who profoundly worries about others and struggles for a diverse community.
- They used an initial resource with powerful digital tools that permitted them to be self-reliant as well as collaborative (the “norm” they interact as kids was a world that operated at speed, dimension and targets).
- Gen Zers were labelled as “snowflakes” and “unwilling to grow up.”. Yet, they have been earning substantial money online over a variety of activities, even involving product placements on fashion-advice sites.

- They are pragmatic, are used to work collaboratively and with flexibility, always being interested to be competent in getting the job done.
- The most pleasant method of communication chosen by them is “in person”.

Industry 4.0

IBM considered that Industry 4.0 is revolutionizing the way businesses manufacture, advance and deliver their products (IBM, 2023). Manufacturers are incorporating new technologies (including Internet of Things (IoT) and Industrial Internet of Things (IIoT), cloud computing and analytics, AI, and machine learning) into their fabrication capabilities and throughout their operations.

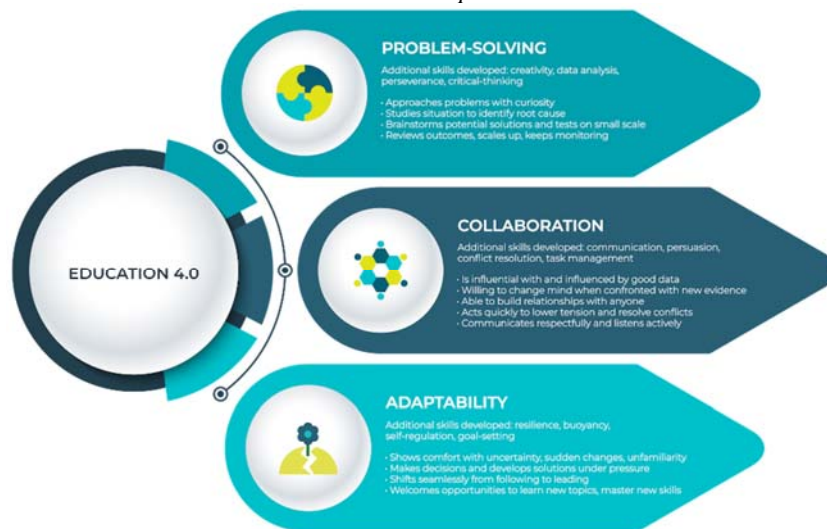
IBM also said that these smart factories are equipped with advanced sensors, implemented software and robotics, that record and evaluate data and allow better decision making. Even higher value is created when data from fabrication operations is combined with operational data from ERP, supply chain, customer service and other enterprise systems to create whole new levels of visibility and insight from previously isolated information.

These digital technologies push to expanded automation, predictive maintenance, self-optimization of process improvements and a new greater level of effectiveness and responsiveness to consumers, which were previously not feasible.

Looking at the present approximations, a growth in production flux availability by 5 to 15% is expected. There are proposal opportunities for energy saving and sustainability by optimization. “For example, in a case study of a multinational in the plastics sector, Industry 4.0, using energy sensors reduced the power consumption in one of its plants by around 40%, which saved over \$200,000 a year in energy. However, only a few countries develop and trade Industry 4.0 technologies.” (IBM, 2023)

But Industry 4.0 introduces a series of specific challenges. The most feared the loss of jobs due to AI and automation. Yet is considered that new goods, tasks, and occupations are generated through economy. Industry 4.0 in fabrication can produce massive grows in productivity, but most organizations in developing countries are not even considered to adopt Industry 4.0.

Figure no. 2. Critical skills that Education 4.0 must impart to students.



Source: <https://www.weforum.org/agenda/2023/01/skillsets-cultivated-by-education-4-0-davos23/>

Education 4.0

(Advani, 2023) revealed that Education 4.0 reimagines education as an inclusive, lifelong experience that identifies accountability for skill-building on the learner, with teachers and mentors being more as facilitators and enablers. To create an environment needed to implement Education 4.0, existent educational systems must be upgraded and financed. The most important three critical skills that Education 4.0 must transfer to students are: problem-solving, collaboration and share (Advani, 2023) (see figure 2).

As intersect the Industry 4.0 characteristics with Gen Z members specificities, some researches and studies were developed. Their results can sketch how the Education 4.0 should be designed for Gen Z and a base for Gen Alpha.

(Abhijit, 2018) said that Gen Z's lives are filled with virtual world connecting and replicating virtually every aspect of the physical world. Think about it, shopping on Amazon.com, streaming on Netflix or calling a trip on Uber is as common as eating, they are exposed to the current and modern technology, from smartphone, smartwatch, electric vehicle, virtual reality (VR), and more. This virtual world is highly customizable and has proposed new ways of representations and communication such as emojis, memes, or GIFs. If Gen Z had inquiries, they Googled it or see it as YouTube video to assist in its application. Thus, research became a part of their way of life.

(Abhijit, 2018) concluded that curriculums should be progressively aligned to research and focusing on industry challenges. The objective should focus on theoretical research combined with the do-it-yourself, frame of mind of Gen Z. So, they will probably look for satisfaction in a non-hierarchical organizational structure with open office spaces that sustain and lead to collaboration and networking, opposite to older generations which worked in offices and cubicles.

On another research (Kothari, 2021) shows that Gen Z consider equally important the components of job satisfaction with flexibility and independence. Yet there is a powerful yearning for Independence. So it was expected Gen Z representatives do not feel that Industry 4.0 (with Artificial Intelligence, Big Data, Cloud Computing, and other booming technologies) is a threat to their jobs. As they consider that remote working is at their fingertips, Gen Z is flexible in its working hours and is willing to accept the norms of corporation. But in these conditions, they expect a communication transparency, autonomy, and independence from the management of the corporations.

(Šket & Nedelko, 2022) concluded that members of "Gen Z strive to achieve their goals in a 'relatively ethical' way through their own actions and efforts rather than by taking side-roads or shortcuts that, in one way or another, are controversial or even illegal". Also, if despite their best efforts, employees do not complete their demands or hopes, they are more likely to find another employee and less likely to take controversial actions, as they are reluctant to take actions that they themselves would not want other people to take.

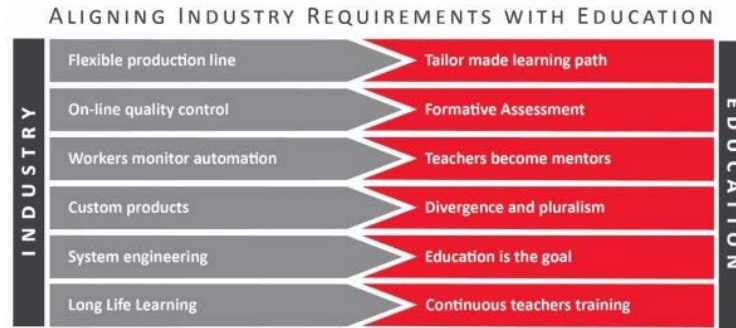
3. Research methodology

The methodology used in the present paper is secondary qualitative analysis method. Based on the information and hypothesis elaborated by the most known sources in terms of validity and recognition.

4. Findings

Education 4.0 should adopt a flexible, tailor-made curricula, instructed by teachers who must become mentors to their students, and consider them as strong and pragmatic individuals. Education should be regarded as a continuous lifelong activity that generates a diverse and pluralistic society where every person knows and activate to their strengths, developing a fair and self-sustaining model for education rather than knowledge (Graham, 2018).

Figure no. 3. Aligning Education 4.0 with Industry 4.0.



Source: <https://intelitek.com/2018/05/11/what-is-education-4-0/>

Applying the research methodology, we compiled 9 trends related to Education 4.0:

Trend 1. Learning should take place anytime, anywhere.

- E-learning tools provide excellent opportunities for distance learning at their own pace.
- The play-based approach in the classroom also plays a huge role, as it allows for interactive learning in the classroom, while the theoretical parts need to be learned outside of class hours.
- Learning can take place beyond the traditional classroom and encourage students to take initiative with their education by extending the “classroom” in any environment. Eg. augmented reality.
- Managed learning electronically without the internet dependency headache.
- Design: learning content must be made beautiful and intuitive

Trend 2. Learning should be personalized for each student.

- Incorporating Self-reflection and Goal setting.
- Flexible & Intentional Schedules.
- Using Digital Content and Tools in a Purposeful Way.
- Incorporating Personalized Playlists.
- Planning for Flexible Seating.
- Involving Students in Grading Conversations.
- Train teachers how to assess students and customize their experience accordingly.
- Use “Ed-Tech” to create a personalized learning environment.
- Allow students to have a part in their learning experience.
- Give students multiple opportunities to show their knowledge.
- Build personalized learning playlist.
- Make the classroom flexible.
- Flip instruction so students can learn at their own pace.

Generation Z students prefer to learn through modern technologies, and they want these technologies to be used in the teaching-learning process. The students are comparing their educators with themselves on the use of technology and can characterized them as outdated and less experienced. So, they believe that teachers should be qualified on the use of technology.

Trend 3. Students should have the opportunity to choose how they want to learn.

- Students should be able to choose their own classes because it would prepare them better for the real world.
- Students only want to take courses that would help them later in life.
- Students have different minds with different interests, and it's unfair to "universalize" the courses that every student at a school must take.

Gen Z recommendation is the use of technology in all lessons. For this, there should be content prepared for each lesson.

Trend 4. Students should be exposed to project-based learning.

- project-based learning encourages students to develop a balanced, diverse approach to solving real-world problems, both on their own and in a team.
- project based learning prepares students for success in the real world like no other teaching style can.

Trend 5. Students should be exposed to more hands-on learning through field experience.

- internships, mentoring projects, and collaborative projects.
- development of technology allows the effective learning of certain fields, thus making more space for acquiring skills that involve human knowledge and face-to-face interaction.

Trend 6. Students should be exposed to interpreting data.

- education is getting very close to a time when personalization will become commonplace in learning.
- apply theoretical knowledge and to use their thinking skills to make deductions based on logic and trends in data sets.

Trend 7. Students should be evaluated differently.

- Change Weighting Scale.
- Use Informal Observation.
- Allow for Self-Assessment.
- Provide Multiple Test Formats.

Trend 8. Students' opinion should be taken into consideration when designing and updating the curriculum.

- their entries help in the development of the curriculum.
- the designers keep the curriculum contemporary, updated, and useful.

Trend 9. Students should become more independent in their own learning process.

- forcing teachers to take on a new role as facilitators that will guide students through their learning process.

5. Conclusions

One of the advantages that Industry 4.0 add to businesses was the speed of collaboration, not only between people but also between machines. Form the research it looks that Gen Zer have the skills and willingness to embrace that speed, but not forgetting, and even demanding, the implications as a person in the collaborative work.

Technology is a natural requirement of Generation Z show this generation, so, use of technology in education is important for the development of this generation. But this means that teachers' qualifications should be at a level that can address the characteristics of the target audience. It looks like that Gen Z are less likely to drop out of high school and more likely to be enrolled in college.

In terms of technology linked to Industry 4.0, Gen Z is more able of taking a positive outlook and value of AI, robotics, automation and how it may help them to accomplish better their profession. In this technically oriented Industry 4.0, if given flexible working hours, a minimum independence and autonomy and an encouraging working environment, Gen Z should thrive and work at their best.

So, Generation Z represent a major challenge in terms of employee management, human resources management, motivation, and work organization in general. At the same time, if understood correctly, Generation Z is an opportunity for employers, as it can offer many advantages to businesses and help to faster digitization and computerization, the implementation of Industry 4.0, increased innovation and quality, and overall business growth and development.

Based on the secondary qualitative analysis of by different organizations and experts about Generation Z, Industry 4.0, and Education 4.0 we found nine trends that sketch how the Education 4.0 should be designed for Gen Z and a base for Gen Alpha.

The nine trends determined are: Learning should take place anytime, anywhere; Learning should be personalized for each student; Students should have the opportunity to choose how they want to learn; Students should be exposed to project-based learning; Students should be exposed to more hands-on learning through field experience; Students should be exposed to interpreting data; Students should be evaluated differently; Students' opinion should be taken into consideration when designing and updating the curriculum; Students should become more independent in their own learning process.

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