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UNCERTAINTIES IN EDUCATION IN THE FUTURE

INCERTEZAS NA EDUCAÇÃO NO FUTURO

INCERTIDUMBRES EN LA EDUCACIÓN EN EL FUTURO

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ABSTRACT

The theme of this essay was uncertainties in education in the future. The title of the essay deliberately refers to education in the future to indicate that it is something unknown and, therefore, uncertain. The objective was to analyze the need for changes in the educational scenario in order to be able to face the challenges that are increasingly present in the daily lives of all the people involved in the educational process. To achieve this aim, the results of recent international research were considered, as well as the contribution of researchers who analyze the competencies and skills considered necessary to prepare students for the future. The results indicate that the adherence to the past in the face of uncertainty about the future is one of the elements that hinder the updating of educational theories and practices, even though the results of recent research show the need for change.

KEYWORDS: Uncertainties; Education; Education in the Future.

Introduction

In the title of this essay, we have purposely used the expression: education in the future rather than education of the future. To choose the second title would be like writing about a form of education, considering that it already exists or that we already know what it will be like in the future. And yet we are in the present, which has been modeled by the past, and we do not know what the future will be like.

Using a metaphor, we can say that we are standing on a bridge, which we know is fixed on pillars at the beginning of one side, and we are walking on pillars towards the other side, but we do not know whether this other side exists. We walk on a path without knowing if we will reach a safe point to continue the way. Yes, by walking we make the path, but where will this path take us? Certainly, there will be a support point,

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a margin on the other side, but it is surrounded by clouds and uncertainties. One does not know what he will face.

Despite the uncertainties, one cannot simply improvise, even though a teacher's first quality, according to Thomas Aquinas (2004), is to have an ingenious mind, that is, a creative and inventive mind. Or, as Michel Maffesoli (2009, p. 11) writes, "the faculty of our era is imagination". However, imagination cannot create itself from zero, it needs a fundament to prepare for its creation.

Predicting the future is difficult and uncertain; we are put in the situation of predicting as much as possible. But would what is foreseen be right? It happens, however, that predicting what is to come is necessary. That is why education is not training. Training is preparing to respond correctly to known situations. Educating, on the other hand, is preparing to act correctly in unexpected and unpredictable situations. So far, most educators are guided by the achievements and mistakes of the past. So, what to do from now on?

Gaston Bachelard used to advise that the success of the past is no guarantee that our actions will be correct in the present and in the future. We make such a statement because it is the present that will mold the uncertain and emerging future. It is worth quoting here Bachelard's (2012) statement in Discours Préliminaire de la Formation de L'esprit Scientifique based on the ideas of Herbert George Wells (1928):

> A professorial soul, all proud of its dogmatism, motionless in its first abstraction, based for life on the academic successes of its youth, speaking every year its knowledge, imposing its demonstrations, all with deductive interest, such comfortable support of authority, teaching its servant as Descartes does or everything that comes from the bourgeoisie as well as the Agrégé de l'Université! (Bachelard, 2012, p. 12).

In this Discours Préliminaire, Bachelard criticizes teachers who live from their dogmatic certainties, invoking their past achievements as well as the ones who resist changes and are not prepared for the surprises of emerging situations, hence the need for new competencies, as we will discuss in the following topic.

New competences to prepare students for the future

Beata Gofron (2014) in the article "School in the Era of the Internet", already stated that school institutions face a serious challenge because the world and the

young people are in vertiginous transformation. There is an obesity of information exploding and constantly emerging. Some write that it may double in 24 hours.

According to the author, it is possible to ponder about the emergence of a new culture caused by the transformations of the Web, from 2.0 to Web 4.0 or 5.0, transforming the cognitive apparatus and, consequently, the way of learning and thinking of the new students.

The students that teachers used to be are no longer in existence. Today, students are multitaskers, incapable of continued, concentrated attention, as explained by Corcini & Moser (2019) in an article in which they presented their research on the subject. Also, one could cite Edelman e Tononi (2000) and Erik Kandel e Larry Squire (2003).

On the other hand, Marc Prensky (2010), Don Tapscott (2009), and others argue that the Net youth are increasingly impatient and want to be valued. Thus, they expect to receive information that is useful to them here and now, rather than knowledge that may be important to curriculum and program developers because it lags behind the cognitive possibilities of their learners.

So, what are the challenges for teachers?

In 2018, the OECD published the document The Future of Education, which emphasizes the ability of teachers to act that requires flexibility so that they know how to adapt and update their knowledge and skills in order to use them in emerging situations.

> The concept of "curriculum" should change from "predetermined and static" to "adaptable and dynamic". Schools and teachers should be able to update and align the school curricula according to the expectations of the changing society as well as individual learning needs and school curricula effectively (OECD, 2018, p. 9).

As a consequence, the development of curricula and programs will be carried out in co-participation between teachers and students, updating what Ralph Tyler (1976) traditionally advocated in 1949, that is, that objectives would be determined according to the needs of the students, the requirements, and the references of the experts. These three bases of support need updating to answer the questions: What will the needs of students be in the future? How will they be able to act and behave concerning the requirements of the society of the future, be it society 5.0, and others

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that will succeed it in 2030 and the years to come? What are the forecasts of experts and researchers who can no longer have the past as a reference point?

It is essential to point out, before we continue, that, in general, the curricula are set by departments, the Ministry of Education, and other instances. We note that, in most cases, the so-called "experts" do not meet with municipal or district, regional, state or national, or even international businesspeople. It does not follow the example, although now dated, of Ron Dearing (1999) when he proposed changes in British universities (Higher education for the 21st century). Nor as did Lee Harvey and his associates (1992), who in their report on the ranking of items and attitudes about competencies and skills, listed the use of technological information (TI) among the last four indicated as the lowest by the 16.000 respondents. Gilles G. Nadeau (1992), in "The Use of Quality and Excellence Indicators in Post-secondary Education", discussed the many uses that could be made of quality indicators by all components of post-secondary education.

With digital transformation and Industry 4.0, new competencies are required and necessary, so that some criteria are fundamental for planning, implementation and operation: a) data management; b) data security; c) human-machine interaction; d) user interfaces design; e) software development; f) data science; g) programming, and h) analytics.

These qualifications go far beyond those envisaged in the QHE (Quality in Higher Education) report, a project started in 1992, and in the Ron Dearing report (1997). At the time, the survey carried out by Lee Harvey, Alison Burrows and Diana Green Birmingham, (QHE, Criteria of Quality), covered more than 16.000 people, including employers, graduates, trainees, university and British government employees.

The survey results listed 111 quality criteria. According to the participants, in order of importance the following criteria stood out: a) effective communication, 93% to 81%; b) teamwork, 91% to 75%; c) ability to solve problems, 87% to 62%; d) analytical skills, 85% to 59%; e) flexibility and adaptability, 84% to 58%; f) self-skills (confidence, management, etc.), 83% to 54%; g) decision-making skills 80% to 46%; h) independent judgment, 79% to 42%, and i) numeracy 77% to 43%, ranging the percentage of importance from 81% to 43%.

The necessary cultural revolution

Digital transformation, with all the possibilities it provides, requires a cultural revolution with direct incidence on education. The goals of education are to fully

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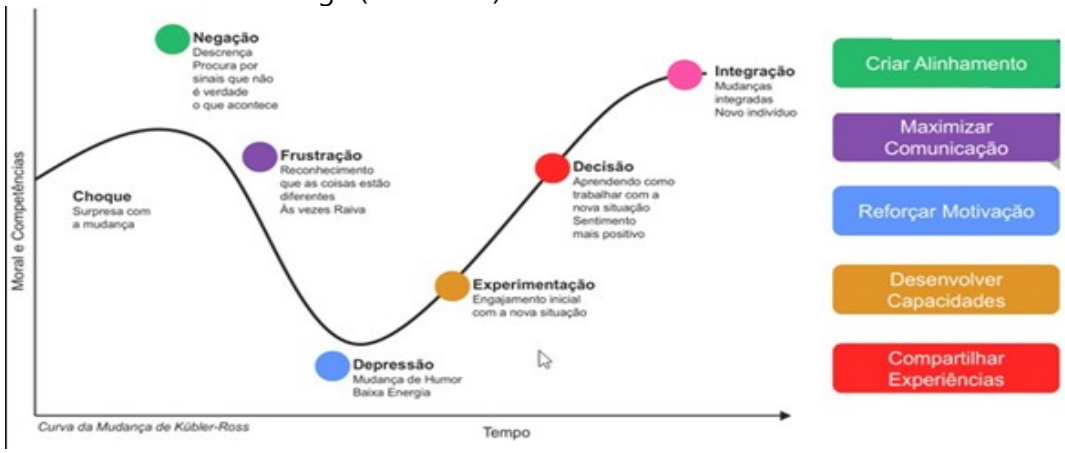
educate the individual, in physical, intellectual, mental, moral, social, aesthetic, and spiritual aspects, in order to fully exercise citizenship. To be an emancipated individual, he needs to have means to do so, means that will come from the exercise of his profession and work. Relationships with work will and are already experiencing changes, such as distance and autonomous work. Distance work is made possible and easier by increasingly agile and user-friendly platforms. Autonomy allows for self-development, self-programming, self-determination, self-control, and self-assessment. In Uberization, for example, the individual sets his goals, his schedule, where to work, which car to drive, which customers, or which runs to accept.

The digital transformation is a revolution, the Fourth Industrial Revolution, as such, brings great challenges. Not only workers or employees of companies feel disoriented, but especially those in charge of the training and education for the new jobs and opportunities to come (Dabi-Schwebel, s/d).

Change provokes anxiety and fear, and consequently almost always gives rise to resistance. Especially because digital transformation requires new skills for which they need to be trained. Elisabeth Kubler-Ross describes it in the Curve of Change:

Figure 1

Kubler-Ross Curve of Change (the 1960s)



Source:
https://jornalempresasenegocios.com.br/wpcontent/uploads/2020/04/tenha_cicatrizes_02.jpg

In the first stage of shock or denial, fear is generated by lack of information, fear of the unknown, fear of looking stupid or doing something wrong. What dominates is the fear of failure and losing one's job. In the next stage, frustration and depression or anger and depression follow. One tries to find a scapegoat, to blame someone else as the target of criticism, repulsion and anger, which gives rise to feelings of suspicion, skepticism, and frustration.

These feelings of denial begin to change when one realizes that the change has worked, and then confusing and nebulous feelings appear, difficult to describe because one recognizes what has been lost. And this is how self-doubt emerges. In this stage, the individual may feel displaced, despised, detached from the group, which produces diffuse feelings such as apathy, isolation, and detachment.

In the third stage, acceptance and integration occur, following the negative stage. Individuals then accept the transformations and try to integrate, reformulating themselves to acquire new skills and be trained in them.

Then follows optimism, the acceptance of the change. The feelings are different: excitement for the new opportunities, a certain impatience for the transformations to happen quickly, and certain relief for not having been wrecked by the changes.

> The final stages involve integration. The focus is firmly on the future and there is a sense that real progress can now be made. When everyone reaches this stage, the situation has firmly changed, replaced the original, and becomes the new reality. The main feelings now include acceptance, hope, and trust (University of Exeter, n/d).

As one can see, change is not a simple process. It causes pain, suffering, resistance, and requires effort and discipline not to go backward and sink. On the educational horizon, resistance to change is further reinforced by the sense of security provoked by the commitment to a past understood as successful.

And education in the future

The Global Summit held in 2017, the future of education, also called Education 4.0, is based on the concept of Learning by doing, as advocated by John Dewey (Bot, Gossiaux, Rauch & Tabiou, 2005). Teachers must change their methodology because learning must be different, more practice-oriented, in the case of digital practices, "hands-on".

Now, learning by doing is situated learning, that acts on reality, learning "hands-on", in the same way that one does not learn to iron with an electric iron by reading about it, but by doing it, that is, trying to get an electric iron and iron a shirt, for instance. It implies, therefore, reviewing the concept of learning, almost always treated as something that takes place in the school or academic environments.

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> Now, shouldn't learning be placed in the context of our lived experience of participation in the world? Wouldn't it be more appropriate if we assumed that learning is as much a part of human nature as sleeping and eating, inevitable for the sustenance of life? (Wenger, 2008, p. 3).

In the "smart" companies of digital transformation and Industry 4.0, workers will need to be able to operate increasingly complex virtual and real systems. They will need to develop the ability to anticipate unexpected situations and be on standby to solve problems, both in data quality and data security.

In automated companies and factories, there is a need for training to perform new digital tasks. The connectivity and interconnectivity of the systems require collaborative work, as the flexible ecosystem requires more versatile operators or employees, able to take on more cross-cutting tasks and able to interact. "Training employees for new jobs, needed for this change in the industrial model, is a major challenge" (Wenger, 2008, p. 3).

However, according to Max Blanchet, associate director at Roland Berger, each stage in the life of a product has been treated in isolation, he says. Thus, today's product design is linked to the process so that the factory itself becomes virtual (Maillard, 2016, n.p.). He further adds:

> These skills will certainly be needed for the design and programming of cobots (collaborative robots, emphasis added), but the user will have a simplified, more intuitive use of the machine. He does not believe that all operators will have to learn to program machines, as they will be as simple to operate as smartphones (Maillard, 2016, n.p.).

In this context, it is essential to train students (all students, not just those in engineering) to know how to work collectively, be it in collaboration with each other, between man-machine, and in the hybridization of competencies.

Students are increasingly demanding digital, effective training that is both engaging and fun. They are no longer satisfied with tutorials, nor with e-learning whose content they cannot assimilate. Learning needs to be retained and fixed.

In contrast, The New Work Order report, released by the Foundation for Young Australians (FYA, 2017), confirms that shortly we will have the replacement of human

labor by robots and artificial intelligence - which can already be seen in various sectors of industry.

> So far, "intelligent" people were those who made the fewest mistakes and had the highest formal learning performance. But technology has changed and will continue to change this. Automation and artificial intelligence will require greater focus on our thinking and interpersonal skills, and we will need to learn and relearn these skills again and again at work (FYA, 2017, p. 14).

The survey done by this study reveals, for example, that over half of students in Australia are focusing their careers on professions that will be made obsolete by technological advances and automation, and in just 20 years, Artificial Intelligence could occupy most of the jobs we know.

To prepare the students, who are in the classroom today, for tomorrow, The New Work Order (2017) report recommends that more emphasis be placed on digital skills and entrepreneurship in school. Other elements that should be encouraged from the early school years raised by the report were: a) Knowing how to deal with people collaboratively; b) Developing creative socioemotional competencies; c) Participating in interdisciplinary projects, which use knowledge from several disciplines.

The EDUCAUSE Horizon Report 2021, on the other hand, summarizes, in general terms, the discussions held and presents a perspective on where the post-pandemic future may lead higher education since it understands that the effects of the pandemic, good or bad, will be long-lasting. From social, technological, economic, environmental, and political trends and after several rounds of voting, six items were selected from a list of 141 as key technologies and practices that will impact the future of teaching and learning: a) Artificial Intelligence (AI); b) Blended and hybrid course models; c) Learning analytics; d) Micro-credentialing; e) Open Educational Resources (OER), and f) Quality online learning (EDUCAUSE, 2021, p. 04).

Regardless of the relevance of the list presented, Microlearning should also be mentioned, although for some it is considered only a movement limited to the Congress of the University of Innsbruck in 2005. At this congress, most of the papers and research dealt with this theme as an attempt to systematize the various works generated since the early years of the last decade (Hug, Lindner & Bruck, 2006).

Microlearning is learning support, both academic and practical, that lasts from 20 seconds to 5 minutes. Whether in written or video form, the goal of these tutorials is

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to succinctly explain a specific content or a particular way of doing something (Salinas & Marín, 2014).

The micro-content and micro-learning are presented by Araújo, Cunha, Luna Neto & dos Santos (2020). For the authors, despite the advances of mobile devices, they still have limitations compared to other traditional gadgets, such as notebooks. About these limitations, Souza e Amaral (2012, p. 4) explain that:

> A relevant aspect in learning with mobility concerns the content, given the peculiarities of mobile devices, especially those related to the reduced size of the screen and keyboard. Thus, the pedagogical content to be conveyed on mobile devices must present characteristics of micro-content so that it meets the aspects of mobility, connectivity, design, usability, interactivity, language, among other requirements.

This resource is pertinent, mainly in our time of the digital or Net generation whose capacity for sustained attention is limited, as the duration of microlearning is less than or equal to 5 minutes, and that is the maximum average time of the mentioned generation (Corcini & Moser, 2019).

Small talks as a knowledgeable assistant can be considered as a form of microlearning. Medeiros, Kolbe Jr. e Moser (2019) created a Knowledge Assistant based on artificial intelligence. THOTH (Training by High Ontology Oriented Tutoring Host) is a cognitive assistant that uses small talk in tutoring conversations. Answers are formulated in small talks (Medeiros, Kolbe Jr. & Moser, 2019).

This knowledge assistant aims to enable students, or researchers in general, to refer to the information needed to fully understand what they read, study or research immediately and quickly.

Conclusion

This essay sought to address the uncertainties in Education in the Future. Initially, it considered the difficulty of dealing with the theme, since we are in the present, which was shaped by the past, and we do not know how it will be in the future.

Thus, based on recent research data from international reports on the educational scenario, and considering the contribution of studies on the subject, we tried to reflect about the need for changes in the educational horizon in order to face the increasing challenges that are presented.

It is not just a question of making increasingly intense use of digital technologies in education, but of trying to recognize, albeit in a limited way, the competencies and skills required very shortly, and to direct efforts so that educational work is conducted under these requirements.

The future is uncertain and uncertainty causes fear and insecurity. Given this scenario, the past tends to insist on the permanence of old theories and practices that give the illusion of security, but that, in fact, represent a resistance attached to the past. It damages the future of those who most depend on educational practice in line with their time.

In the period marked by inequality, in which access to cultural goods may mean the only way to change, the need for humanization is urgent, that is, education for all, but this does not mean attachment to the past due to the uncertainties in education in the future.

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RESUMO
Este ensaio teve como tema as incertezas na educação no futuro. Propositalmente, o título do ensaio se refere à educação no futuro para indicar que se trata algo desconhecido e, portanto, incerto. O objetivo foi analisar a necessidade de mudanças no cenário educacional para que seja possível enfrentar os desafios cada vez mais presentes no cotidiano de todos os sujeitos envolvidos com o processo educacional. Para tanto, consideraram-se os resultados de pesquisas internacionais recentes, além da contribuição de pesquisadores que analisam as competências e habilidades tidas como necessárias para preparar os estudantes para o futuro. Os resultados indicam que o apego ao passado diante das incertezas quanto ao futuro é um dos elementos que dificultam a atualização de teorias e práticas educacionais, ainda que os resultados de pesquisas recentes evidenciam a necessidade de mudanças.

PALAVRAS-CHAVE: Incertezas; Educação; Educação no Futuro.

RESUMEN
Este ensayo tuvo como tema las incertidumbres en la educación del futuro. De forma intencional, el título del ensayo se refiere a la educación en el futuro para indicar que se trata de algo desconocido y, por lo tanto, incierto. El objetivo fue analizar la necesidad de cambios en el escenario educativo para que sea posible enfrentar los desafíos cada vez más presentes en el día a día de todos los sujetos involucrados en el proceso educativo. Para ello, se consideraron los resultados de investigaciones internacionales recientes, además de la contribución de investigadores que analizan las competencias y habilidades consideradas necesarias para preparar a los estudiantes para el futuro. Los resultados indican que el apego al pasado frente a las incertidumbres del futuro es uno de los elementos que dificultan la actualización de teorías y prácticas educativas, a pesar de que los resultados de investigaciones recientes evidencian la necesidad de cambios.

PALABRAS CLAVE: Incertidumbres; Educación; Educación en el Futuro.