EFFECTIVE LEARNING AND TEACHING TOOLS IN HIGHER EDUCATION

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Abstract

Globalization and technological revolution continuously creates new changes in the international market – and social environment. Such crisis-type changes like COVID 19 or the current energy-crisis generates even more remarkable and unpredictable turning points in the human relations and customer habits.

These changes also make the education systems need new approaches and changes: modern education methods and actualised communication practises should be installed — the strong regulation environment of the education-institutions and the diversity and complexity of the factors affecting the efficient knowledge-transfer practices makes this topic compounded and complicated enough so that it is worth studying the interrelations of the various factors influencing the adaptability of education.

This study introduces the results of 2 primary research: (a) a questionnaire survey about the usage of smart devices in the studies of the Hungarian and international university students in Hungary, and (b) a focus-group research among the members of the 2 target groups (mentioned above), in which the interviewees were asked about what kind of educational methods they find effective in the realization of their carrier goals within the changed social and economic environment.

Keywords: *macroeconomic environment, online communication tools, new methods of education, effective knowledge transfer*

1. INTRODUCTION

The events of recent years have shown the importance of the impact of macro-environmental elements in the understanding of the changes in the social and market environment. Getting to know the innovations created by the technological environment has become one of the cornerstones of the companies' operations. This is especially true in the service industry, where the technological knowledge of customers sometimes exceeds the knowledge of service providers. Technological options not only make day-to-day problem-solving easier, but they also contribute to cost reduction in several cases, and in this connection, they can help companies in the area of sustainability.

In the labour markets, the important elements of the current demand are to improve problem-solving skills, to solve non-routine tasks, to work in project teams, and to keep up with the permanently changing requirements of the global markets. These are really important expectations that higher education students should fulfil when finishing their studies and start their careers. As a consequence of that, the most important purpose of their studies is no longer the learning of the facts but the generating of a flexible and creative knowledge-base which can be used in different situations.

Our study focuses on the analysis of the service sector's labour needs towards higher education. The objective of our research is to examine the impact of digital competencies in the behaviour of Z-generation students. We examine the information and communication technology (ICT) tools used in the workplaces and in education.

2. THEORETICAL BACKGROUND

In order for companies to be clear about their own position within a given industry, they must know the impact of macro-environment elements on the market. The best tool to use for this analysis is the

PESTEL method that was invented by Francis Aguilar in 1967. PESTEL is an abbreviation, a mosaic word, for Political, Economical, Social, Technological, Environmental, Legal environment. PESTEL can help to understand the impact of the external forces onto the industry, and create opportunities and threats for the companies (Siddiqui 2021). It is also important to know that the elements of the PESTEL tool are in connections with each other.

It is also important to highlight that the elements of PESTEL have a serious effect on each other, such as the political environment for the legal environment to create laws, or the technological environment to protect the environment with a simple solution such as the electronic invoice, which replaces the paper invoice. In this study, we focuses on the impact of the technological environment on the higher education.

Services are deed, processes, and performances, according to Zeithaml et al. (2006). Service is defined as an activity between a service provider and a service receiver to solve a problem (Kimita at al. 2009). The definition reflects the change that happened due to the solving of the problem.

The service sector can be considered the leading sector of national economies. The following services belong to this sector: communal services (energy, water, and sewer); financial services (banking, insurance, etc.); transportation, consulting services (legal-, health issues); health services, entertainment services, tourism and education (Veres 2009).

In this publication we focus on Generation Z within the higher education service industry.

2.1. Generation Z

Currently, as a result of the development of computer technology, the use of the Internet and the spread of various real-time marketing systems (e.g. chatbots), the time required organizing many services has already shortened. Interactive websites make it easier for both the seller and the buyer to find their way around. Thanks to the rapid development of information and communication technology (internet, third-, fourth- and now fifth-generation mobile phones, digital television), the education sector has been reorganized (Grotte 2020).

Since the focus of our research is on students born between 1995-2010, i.e. Generation Z, we consider it important to present them.

Fintechradar (2016) characterizes Generation Z as the first generation who were actually born with a mobile phone in their hands, as the oldest were seven years old when the iPhone appeared.

TARI (2011) defines generation Z as the first global generation, which means that – regardless of nationality – they like the same food and music, grow up in the same culture, and even use the same fashion brands in all parts of the world, because everyone is always online whether on a smartphone or other information technology device.

In 2013, the author couple Pál-Törőcsik came to a very similar conclusion. In their research examining the consumer habits of Generation Z at the University of Pécs, they described that the most important thing for this generation is to know and handle electronic devices at a high level, they share every little moment of their life with the public, and they are also characterized by personal freedom, practicality, initiative and courage. They also found that loyalty is not their strength from a consumer point of view.

In the following, let's take a look at the theory of education and active learning.

2.2. Education & Active learning theory

The Educational Services sector comprises establishments that provide instruction and training in a wide variety of subjects.

In today's education system, it is possible to prepare a skilled workforce within the framework of public education, higher education, and vocational training outside the school system. The economic and social expectations of schools are manifold (Horváthné Petrás & Grotte 2021).

Global Educational Services Market to Reach US$1.9 Trillion by the Year 2027 (Businesswire 2021).

Is there any more important service sector for the nation? Other nations have seen this and investing in the minds of young people. Both Singapore and Israel are exemplars of nations investing in education, with Israel leading the world in patents per capita. And the Republic of Korea invests up to 22 percent of its GDP in education (Larson 2009).

In recent years, the rapid development of electronic and information technology tools in the education market has forced both consumers and service providers to learn.

In order to maintain student interest, reduce dropout rates and prepare students for technology-based society higher education institutions have to integrate active teaching and learning methods. Innovative approaches in higher education are shifting away from teacher centered instruction to student centered learning. Latest research indicates that the active learning methods could be an effective approach for present age higher education students (Price & Kirkwood 2014). The active learning techniques integrate the following student centred learning methods (Fig. 1).

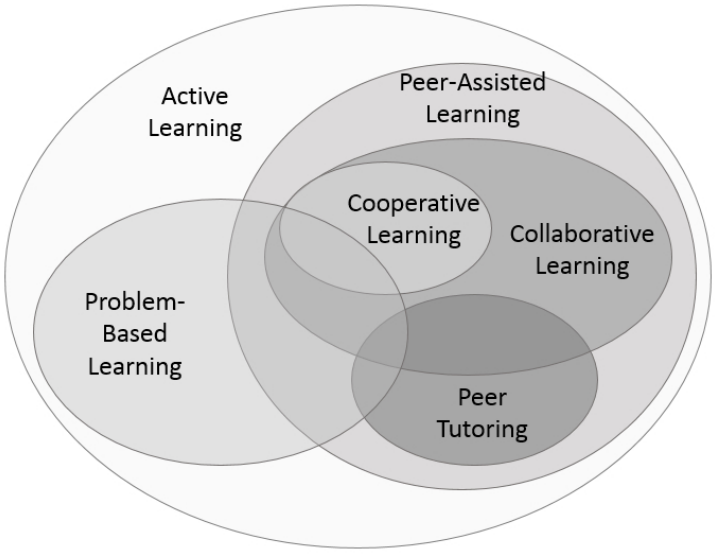

Fig. 1. Venn diagram of active learning methods

Source: Bishop, JL & Verleger, MA 2013, "The flipped classroom: A survey of the research", *ASEE National Conference Proceedings*, vol. 30, no. 9, Atlanta, GA.

Problem-Based Learning: Acquiring knowledge and the learning process are based on problem solving. Students themselves decide what kind of knowledge is necessary to solve the given problem and task. This method develop (1) flexible knowledge, (2) problem solving skills, (3) self-directed learning skills, and (4) collaboration skills (Bishop & Verleger 2013).

Project-Based Learning: Knowledge acquisition can be carried out by developing a product. Project-based learning methods can initiate autonomy in learning. Building teams can make use of individual differences (previously mastered skills or learning styles) producing differences in added values. By breaking the task into sub-tasks, students can decide how to work out each part, depending on skills, knowledge, or preferences of individuals, in order to fulfil project activities. Planning skills can be also developed when working out project plans and distributing tasks and responsibilities at the very beginning. Communication between the students has vital importance. Competences in communication, cooperation, and the handling of conflicts can be developed. Taking individual responsibility is a key factor as not keeping a deadline can risk the implementation of the whole project (Ilona et al. 2011).

Peer assisted learning: means that „students learn from and with each other in both formal and informal way" Peer learning involves cooperative and collaborative student work. In peer learning environment

students communicate more about the learning issues than they do when teachers present learning content. Active learning methods are union of peer assisted learning and problem based learning approaches (Bishop & Verleger 2013; Boud, & Cohen 2014).

Flipped Learning method: In the last years, numerous educational studies focus on flipped classroom method. Therefore, there are several definitions on flipped learning. "In the Flipped Learning model, teachers shift direct learning out of the large group learning space and move it into the individual learning space, with the help of one of several technologies". The pre-recorded lectures can be given to students as homework, leaving class time open for interactive learning activities—activities that cannot be automated. We define the flipped classroom as an active teaching/learning method which has two parts: (a) computer-based individual, self-directed learning outside the classroom; (b) open ended problem based collaborative work and activities inside the classroom (Jensen, Kummer & Godoy 2015; Béres & Kis 2018).

2.3. Integration of the technology

The effective higher education knowledge-building model can be integrated into institution LMS systems, the tools missing from LMS can be implemented with web-based applications. With the usage of LMS (e.g. Moodle, CooSpace) and web 2.0 and web 3.0 applications, the personalized online and face to face learning process can support and can be widely applied in higher education.

There are several benefits of integrating technology in the higher education learning process. The ways of teaching can be more diverse, students can be involved in their learning process, technology can help students to focus, and can support students' motivation and collaborations (Aljawarneh 2020). It is the instructor's responsibility to create an environment and find the appropriate tools, which is suitable for knowledge building and communication.

2.4. Effective knowledge transfer for Generation Z

Both education system and also the promoting company culture of the employer companies should offer good opportunities for effective knowledge transfer to all their students and employees. If we look at the quickly changing elements of the current market and social environment, this expectation even gets higher importance. Several publications in this topic highlight the importance and benefit of experienced-based learning methods over the classical information-based ones (Caniglia et al. 2016; Birdman et al. 2020). The introduction of some active learning techniques in chapter 2.2. also aimed to underline its relevancy in current educational practices. In case we add the characteristics of Gen-Z (summarised in 2.1. before), we can see the encouraging opportunities of the usage of new learning techniques in higher education and in company procedures, too.

3. RESEARCH METHODOLOGY

In our primary research, we combined the qualitative and quantitative research methods: in the quantitative part, we carried out an online questionnaire research, where (based on the omnibus-approach of research methodology) we asked university students about their usage of online tools in their higher education studies and during their touristic-purpose trips. Our quantitative research is based on a focus-group interview, where we asked nine university teachers about their teaching methods and about their use of online tools in their teaching practices.

Our survey is based on an online questionnaire survey in which we managed to ask 305 university students who study in Budapest universities in bachelor and master university programmes in Hungarian language about their usage of online tools during their university studies. During the survey, we first distributed the questionnaire on the online education platforms of our own university, then it spread among our students' acquaintances – typically via social media channels – among the students of other universities then it was further distributed by our teacher colleagues among students of other higher education institutions. The survey therefore was not conducted by random sampling so the research cannot be considered as representative; the distribution of the sample along the basic socio-demographic indicators is contained in the results description subsection.

There are several methodological arguments for conducting a questionnaire research: in addition to time and cost efficiency, it is completely valid for our target group that its members are available on the internet. Since our topic does not focus on the entire population, the fact that internet users are typically more educated and have a higher social status within the entire population is not a distorting factor for us (Bányai & Novák 2015), as our survey focuses directly on the young university students.

The absence of an interviewer may have a negative effect on the degree of the respondents' involvement and on the frequency of possible misunderstandings with certain questions (Babbie 2020). However, we tried to counterbalance this by making our questionnaire simple with a clear structure that can be completed within approximately 5-8 minutes.

Finally, the argument in favour of the online questionnaire method was also the explanation that when filling it out, the system actually guides the respondent through the questions, so their logic and the groups of the topics can be followed more clearly.

Among the questions assessing of university studies, we asked about the typically used smart devices and about the familiarity and active use of applications/ websites / online platforms that support studies. Online sites evaluating the quality of the supply may also be relevant in this area: here we asked about the online evaluation of instructors.

In terms of socio demographic data, we considered only the questions of gender, age group and place of residence (interpreted only in the relation of Budapest vs. countryside) to be relevant for our topic.

In the focus-group interview we asked 9 university teachers about the digital technology types that they use in their teaching practices: 3 of our interviewees teaches methodological subjects (like mathematics, informatics and statistics), 3 of them are from the field of tourism-management and the last 3 deals with the topics of economics and management.

4. RESULTS

The increase of the usage of information and communication technologies (ICT) in all areas of life, including higher education is obvious over the last 10 years in the world.

Our quantitative research goal was to analyse the digital device usage habits of Hungarian university students during studies. Our aim was to discover the prevalence and awareness of used digital tools to support their higher education learning processes.

Our questionnaire survey took place in the fall semester of the 2022/2023 academic year. The participants of our research are full-time students of 26 different higher education institutions (n=305). The majority of respondents (55%) belong to the 18-21 age group, 22% to the 22-24 age group, and 23% older than 25 years. During the analysis, we covered both aspects.

4.1. ICT in Education

As in all parts of life, the high level of usage of digital technologies is essential in higher education as well. The conscious use of digital devices plays key role. Therefore, in our research, we mapped the usage of digital tools for educational purposes.

Based on the results, it can be seen that the smartphone and the laptop are the two most frequently used digital devices in higher education learning process (Fig. 4).

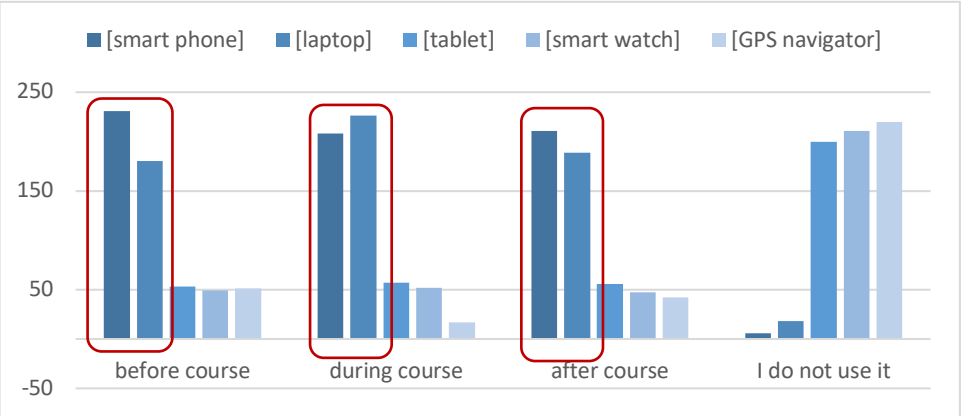

Fig. 4. Which devices do you use for your studies?

Source: Own editing

The most popular digital platforms that support the students learning process are search engines and chatbots, which play important role in all phases of studies (Fig. 5).

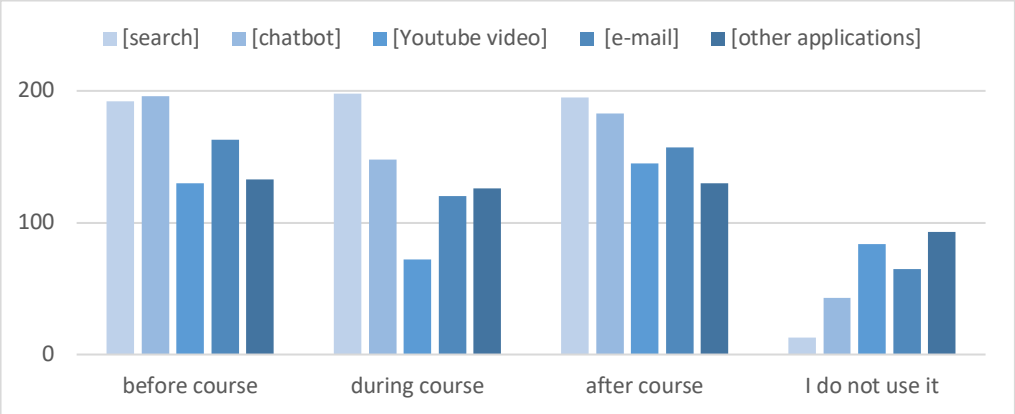

Fig. 5. Which online platforms do you use to obtain information during your studies?

Source: Own editing

Overall, a range of digital tools and online platforms are used by university students to organize and manage and support their studies. They use an educational system (our university use Neptun) which allows the administration of study and exam matters. Coospace (or Moodle) as a support system for teaching, which is a virtual, interactive educational space where instructors can share course materials with students and ask students questions. And of course, the teachers can use a lot of other online tools and platforms to make their lessons more active, we collect them from our interviewed teachers in the next subchapter.

4.2. Focus-group research

The nine interviewed university teachers were asked in the same focus group and represented three main fields of study (as it was introduced before). In the table below, we summarize the digital technologies that they use and which can effectively support active learning approach.

Learning activity	Methods	Implementation	Technology
Processing of study materials	Presentation online content, video tutorial, quiz	Seminar, visual and auditory contents, narration	VUE, Mindomo, CamStudio, Screencast-O-Matic, Google Apps, Prezi, Canva, MS Office apps
Communication, cooperation	Group discussion, feedback, reflection	Face-to-face and online discussions between the instructor and students or between students, text messages	Forum, Mentimeter, Wiki, OU Wiki, Blog, Skype, Facebook, Teams, Zoom, Google Meet
Productive: project work, project product creation	The goal is one production of a product	Data collection, analysis, development, synthesis, knowledge sharing	Google SketchUp, YouToube, ZohoProject, OpenProject, Gantt Project, Trello
Experimentation	Interactions are activities aimed at solving a specific task or problem	Examination, research, case study, game, role play	QR code generator, escape room apps
Formative assessment	Teammate, peer evaluation, self assessment, reflection, portfolio	Online form, face-to-face and online discussion	GoogleDocs, GoogleForm, MS Forms, Mentimeter, Kahoot

Table 1. What kind of digital technologies you use in the classroom? Which of them can effectively support active learning approach?

Source: Own editing

5. CONCLUSIONS AND FUTURE WORK

The 305 respondents of the research proved to be particularly suitable to reach our research goals as all of them are university students. Smartphone is the most important and most generally used tool in their use of internet devices in their studies; university studies are also supported to a very large extent by laptops in this age group; the use of other smart devices appeared much less frequently in the answers compared to these ones. The results lead to the conclusion that internet content and applications available from mobile phones are becoming increasingly important tools in the knowledge-transfer practices of higher education. For the targeted age group (for the members of generation Z) it is natural to use the internet content when preparing for projects and exams – mainly with the help of their smartphones. In higher education, in addition to smartphones, laptops also play an important role in studies: either they help in the practical tasks in keeping contacts with higher education institutes (e.g. enrolment), or they transmit the knowledge of the courses (e.g. in the forms of course materials uploaded to university platforms, or as knowledge content available in online search engines).

What follows from these results? Of course, the requirement is obvious, service companies must pay a special attention in their promotion policies to transmit effective and attractive offers towards their young target groups by their online presence and online marketing tools. This affects not only the content of the promotional messages transmitted, but also the efficient and diverse use of the possible online messaging tools (e.g. the appropriate combination of the written-, the audio- and the visual messages) as well as the availability of content from a variety of devices and in a variety of ways.

However, we can feel that the efficient marketing policy for the targeted groups cannot be considered as having been fully completed by the optimization of the online toolset of promotional policies.

What can be that theoretical framework for the higher education which can help them to carry out a real strategic answer for the members of Generation Z who actively use their online tools so that this strategy can effectively address this target group and – at the same time – companies can reach a significantly higher level of effectiveness, much better client satisfaction and a more successful demand strategy? The concept of consumption experience is complex and diversified enough so that it can define the elements in the higher education sector by which companies can realize a more successful market strategy and can reach higher customers' satisfaction - moreover, we could also interpret all this from the perspective of a more active consumer online presence.

The consumer experience concept focuses on the individual customer who is currently using the service and not on an average picture of the buyer (Toffler 2002): it explains and further develops the consumer behaviour theory – saying, that customers at our age do not really focus on possessing the goods when buying a product or a service, but rather on the experience instead which they can obtain by the buying these goods. This is especially true for the younger customers nowadays who are from the late Y-generations and from Gen-Z.

The theory captures the consumer experience in the most complex way possible: it is aware – on one hand – that the nature and quality of the emerging experience is actively influenced by the emotions of the individual who is currently using the service (Zátori 2014) and the creation of the consumer experience is realised by the interaction between the service company and the individual using the service. During the interaction, the consumer's experience can be positively influenced by the consumer's involvement in the experience development process - of which Csíkszentmihályi (2017) has already drew our attention in his flow-theory. A very valuable interpretation of the consumer experience theory is given by the so-called continuous experience approach (Caru & Cova 2007). According to it, in the joint experience creation process of the customer and the service company, the two parties can participate in with various participation rates: in extreme cases, only the consumer himself creates his experience with the full and totally active participation of his own creative personality from fairly average service conditions. In the other extreme case, the company provides a ready-to – deliver experience: in such cases, the experiences are typically excessively intense with full of masculine characteristics, when the consumer rather participates as a spectator in a slightly exaggerated and staged production. (Caru & Cova 2003). The ideal case – of course – somewhere in between, when the service company lets the experience be formed by the preferences and personality of the customer. At such cases a dialogue can develop between the two parties, in which the company can show its customer those options (the spectrum of the available experiences), in which the consumer can decide it him/herself how much he/she participates in the creation of his/her own experience and what will be the extent to which he transfers the creative process to the company (Prahalad & Ramaswamy 2004). At last the Pine–Gilmore for experience dimensions provides exceptionally rich additives to the consumer (Pine & Gilmore, 2019), in which the four factors of entertainment, education, esthetic and escapism are continuously developing by the personality of the consumer and by his participation on the experience-forming process. This participation can be active or passive and it can also happen with absorption (where the consumer is actively learning) or with immersion (where he rather accepts the new experience) (Fig. 6).

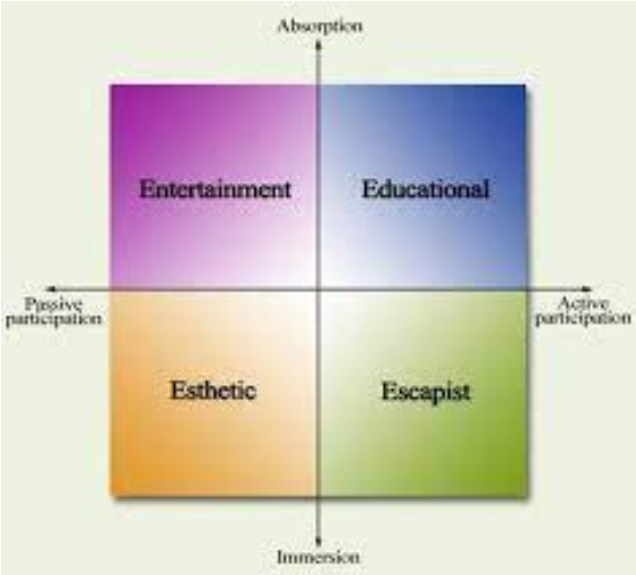

Fig. 6. Pine-Gilmore experience dimensions

Source: Pine, BJ & Gilmore, JH 2019, *The Experience Economy: Competing for Customer Time, Attention, and Money,* Harvard Business Review Press, United States.

After the very brief introduction of the consumer's experience theory, it is worth summarizing how the results of the primary research (the questionnaire survey) can contribute to the development of the service-supply of the higher education in our country. Based on the results of the primary research, we already know the far majority of the university students asked in the survey typically use their mobile phones for searching information.

In their university studies, the respondents also use their laptops with high intensity besides their smartphones. Search engines are used with the highest intensity by them both at their travels and also during their education – these are followed by message sending platforms and chatbots.

Based on these research results, it is therefore important to understand that in the sector of services (including the sector of higher education) – it is not only worth to convince the young members of the Z-generation target group by using the online toolkit of company promotion strategies about the efficiency and competitiveness of the offered service. There are also rich opportunities of using online tools in the real service places of educational services (like e.g. in university study rooms or in museum exhibitions halls). It is important to understand that offering high level of students' experience (customer experience) in the market of higher education means far more than the online availability of study materials: the high level of students' experience in education offers the clients (university students) the opportunity of *real understanding* of the substance of the material and also the experience that they can already use and apply their freshly-obtained knowledge in solving practical business problems.

The online tools to be used can fairly be adjusted to the needs, to the cultural- and educational level of the current customers (visitors). By using these modern online tools, services can become such complex and rich customers' experiences that can assure long-term competitiveness to the given company or institution by the loyal and returning visitors or by their authentic recommendations. Technologies of virtual reality or of augmented reality are only some examples of the several available value-added service options.

As long as the customers can continuously get new experiences (including the experience of the effective knowledge transfer) in the educational sector, it can get long-term competitiveness to those companies who offer the online tools to them within the package of holistic and high-value experiences. The concrete opportunities at these fields are worth to be introduced in one of our following articles.

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