Educational Paradigm Shifts Among Generation Z University Students

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Abstract: The paper focuses on the educational paradigm shifts of Generation Z university students, which can be characterized as a 'digital generation' growing up in an environment of intensive use of technology. One of the areas where the specificities of this generation are particularly evident is education. The aim of the paper is therefore to explore the extent to which university students belonging to Generation Z prefer digital information resources to traditional ones, and how these preferences influence their exam preparation and overall study style. Particular attention is paid to the selection and use of information sources, learning strategies and attitudes towards electronic forms of learning. The research conducted on a sample of 863 university students from Slovak republic focuses on several areas: dominant learning styles, selection and use of information resources, forms and tools of study, as well as technical devices used when working with study content. The research was guided by an attempt to answer the following research questions: Do Generation Z university students prefer new digital information resources over traditional ones? Which learning method do Generation Z university students prefer during their studies? Do Generation Z university students prefer electronic learning materials over print materials? Are there differences in preferences by year or level of study? The results have yielded several interesting insights into the current preferences of Generation Z university students. The results show that digital resources, such as articles from websites or videos on YouTube, play a complementary but not dominant role. Materials directly from teachers and their own notes remain the most used resources, indicating a strong link to traditional and proven sources. While digital tools find use, they do not serve as a primary source. The results also provide an up-to-date view of the changing educational preferences of this 'digital generation' and point to the importance of traditional information resources and learning styles during higher education.

Key words: Education, Generation Z, Learning, Technologies.

1. Introduction

Generation Z (born mid 1990's and 2010), often referred to as the digital generation or digital natives, is the subject of intense research in various fields - from sociological and psychological to consumer and educational aspects. Nevertheless, much remains open regarding this generation, and the dynamic evolution of the social and technological environment requires a constant revision of knowledge. Generation Z, like previous generations, is undergoing a continuous process of change, which is also reflected in its educational preferences and attitudes.

One of the areas where the specificities of this generation are particularly evident is education. Current research points to specific attributes of Generation Z that shape pedagogical strategies, learning styles and approaches to teaching. This is not just about the use of digital technologies in the traditional sense, but about their deeper integration into the educational process, including artificial intelligence tools. As Chairunisa et al. (2024) and Pavlíčková et al. (2024) point out, technologies such as virtual reality (VR) and augmented reality (AR) play an important role in creating immersive learning experiences and increasing student engagement.

Personalised approaches to learning, using artificial intelligence and real-time feedback, as described by Chardonnens (2025), promote self-regulated learning and make the whole learning process more efficient. In addition, gamification is also coming to the fore, which according to Islawati et al. (2025) and Čekrlija (2024) positively affects the motivation and attention of Generation Z students.

However, despite these technological opportunities, practice in higher education environments shows that Generation Z students still often prefer traditional forms of learning, with digital technologies playing a rather complementary role. This ambivalence between the generation's technological background and its actual behaviour in the context of studying poses a significant research problem.

Therefore, the aim of this paper is to investigate to what extent undergraduate students belonging to Generation Z prefer digital information resources over traditional ones, and how these preferences influence their exam preparation and overall study style. Particular attention is paid to the selection and use of information resources, learning strategies and attitudes towards electronic forms of learning.

2. Literature Overview

The current research literature agrees that Generation Z, growing up in a highly digitalised environment, has different learning needs and preferences compared to previous generations. Their digital orientation, multitasking ability and creative thinking require new, responsive approaches in teaching (Wajdi et al., 2024; Hendrastomo & Januarti, 2023).

Generation Z is characterized by high levels of technological proficiency, self-awareness, but also short attention spans (Huss, 2023; Hendrastomo & Januarti, 2023). According to Putri (2024), these characteristics translate not only to the academic environment, but also to the work environment, where Generation Z values security, comfort, and inclusiveness (Nasrudin et al., 2024).

At the same time, it appears that despite the technological background, students often face challenges with critical thinking, analysis, and original content creation (Collantes & Jerkovic, 2024), pointing to the need to develop metacognitive skills.

Generation Z's preferences are clearly towards interactivity, visuality and personalisation (Chairunisa et al., 2024). The use of virtual and augmented reality, gamification and mobile applications is seen as an effective tool for increasing motivation and engagement (Pavlíčková et al., 2024; Čekrlija, 2024).

According to Putri et al. (2024), the use of appropriate technologies in specific subjects such as history can significantly promote critical thinking and creativity. At the same time, Annuš and Takáč (2023) point out that the combination of digital and traditional materials enhances the effectiveness of learning, especially for Generations Z and Alpha.

Nevertheless, students do not reject traditional forms of learning but demand their supplementation with interactive elements (Pavlíčková et al., 2024; Blachowska-Szmigiel, 2024), thus confirming the need for hybrid approaches in education.

Several authors have addressed the topic of artificial intelligence (AI) in education. Chardonnens (2025) recommends its responsible integration alongside active and metacognitive strategies as part of a holistic approach to education. Surjandy et al. (2024) identify eight key factors that influence the success of AI implementation - for example, perceived stress, risk, ethics and quality of service.

At the same time, however, research shows mixed results for the implementation of AI in teaching, which calls for a deeper analysis of the impacts on the quality of learning and the student experience (Surjandy et al., 2024). Personalising learning pathways with AI (Chardonnens, 2025) and combining it with gamification is also a challenge (Chairunisa et al., 2024).

Socio-demographic factors also play an important role in student behaviour. Berková et al. (2024) found that gender, field of study and form of study influence the use of digital platforms. The largest differences were found among students in engineering, economics and humanities.

Effective teaching for Generation Z requires redefining traditional pedagogical approaches. According to Čekrlija (2024), classical methods such as long lectures are losing their effectiveness and there is a need to shift the emphasis to hands-on, research-based and data-driven activities. At the same time, Atmaja and Khalid (2023) highlight the importance of autonomy, differentiation of content and real-world problem solving, which leads to greater student engagement.

Nasrudin et al. (2024) extend the discussion to the importance of character education, which should be implemented across family, school, and community settings using strategies that resonate with the digital context.

The findings above show that Generation Z requires flexible, interactive and technology-enabled education that reflects their digital socialisation and individualised needs. Effective educational strategies should link innovation with proven principles of pedagogy, while reflecting the social background and cognitive specificities of this generation. Thus, the literature agrees on the need for hybrid and personalized approaches, while the emphasis should be on metacognition, engagement, character education, and a balance between technology and the human element in education.

3. Methodology

The aim of this paper is to analyse the preferences of students belonging to Generation Z in the use of information resources during their university studies. Specifically, we focus on finding out whether they prefer digital information resources over traditional ones, how these preferences affect their exam preparation and overall learning style, and whether there are differences in these preferences depending on the year and level of study.

The research was carried out at the Faculty of Mass Media Communication at the University of Ss Cyril and Methodius in Trnava. The sample consisted of 863 respondents - full-time students of bachelor's and master's degrees. The research set was non-probabilistic, purposive, and the criterion for inclusion in the research was belonging to Generation Z and active study at the faculty.

Data collection was conducted between September 24 and October 7, 2024, through an electronic questionnaire consisting of four main questions and two identification items. Two of the main questions employed a Likert scale to measure respondents' attitudes. The questionnaire was anonymous, and completion was voluntary. Respondents were informed of the purpose of the research and the voluntary nature of participation prior to the start of the questionnaire.

The research focused on three main areas:

1. Preferred information sources (monographs, textbooks and scripts, professional books, articles from websites, blogs, videos, lecture materials from teachers, own lecture notes, ...).
2. Mode of learning (reading, watching, listening, doing assignments)
3. Preferred sources of study (materials in electronic, printed or combined form)

The data obtained were analyzed using descriptive statistics. The research was guided by an attempt to answer the following research questions (RQ):

RQ 1: Do Generation Z university students prefer new digital information resources over traditional ones?

RQ 2: Which learning method do Generation Z university students prefer during their studies?

RQ 3: Do Generation Z university students prefer electronic learning materials over print materials?

RQ 4: Are there differences in preferences by year or level of study?

4. Results and Discussion

We focused on 3 main areas of inquiry: (1) what resources students use while studying, (2) what learning style they prefer, and (3) what materials they prefer while studying.

We classified the study resources into the following categories: monographs, textbooks and scripts, professional books, articles from websites that cover the topic, blogs, videos (e.g., on YouTube), webinars or other online courses, podcasts, lecture materials from faculty (presentations and other), self-reported lecture notes, worked-out questions from upper-level students, worked-out questions available on the Internet. We defined the frequency of their use in the following range: use as a priority, use as a supplementary source, use exceptionally, if I cannot find information in other sources, do not use.

We defined the way of learning in the following categories: reading books, study materials, watching videos, webinars, listening to recordings, podcasts, doing assignments, assignments, term papers. We defined the degree of preference in the following range: prefer, partially prefer, do not prefer.

We have defined study materials into the following categories: printed materials, electronic materials, and combined materials.

Several interesting findings emerged from the results of the investigation. The most frequently used resources for studying and preparing for exams are lecture materials from teachers and their own lecture notes. These resources are used by students on a priority basis. As a supplementary source, articles from websites dealing with the topic, videos on platforms such as YouTube, and professional books or textbooks and scripts are most frequently used. Conversely, podcasts, professional books and webinars or other online courses are among the sources that students use only exceptionally if they do not find the information in other sources. Monographs, blogs, and webinars are among the resources that students use minimally when preparing for exams. More detailed results are shown in Figure 1.

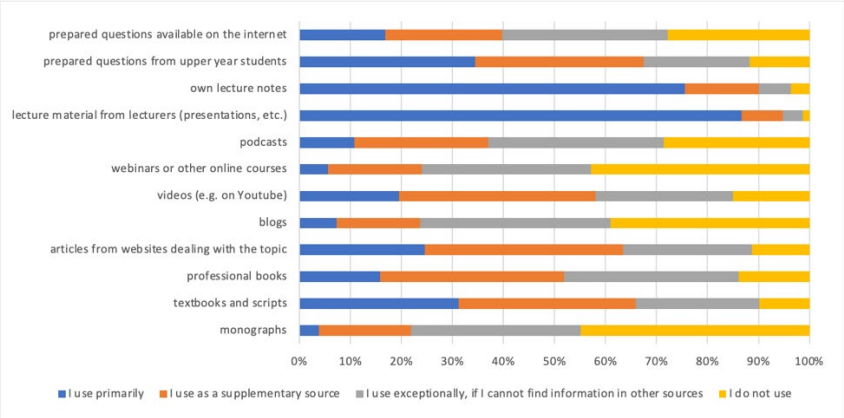

Figure 1: Resources used in studying and preparing for the exam (n = 863 respondents)

However, a comparison of the resources used by students in different years of study (1st Bachelor, 2nd Bachelor, 3rd Bachelor, 1st Master, 2nd Master.) yielded interesting findings. According to the results, there is a difference between the years in the preference and choice of information sources. While the lower grades prefer formal materials, the upper grades are more likely to prefer practical, shared and informal materials. In general, however, digital resources are strongly preferred over printed books and monographs, while traditional academic resources are perceived as more complementary. Differences can be seen in the following areas surveyed:

1st Bachelor students are more likely to use textbooks and scripts and materials from lecturers. These results suggest that these students are still strongly anchored in formal or so-called traditional forms of teaching, which may be a consequence of their previous mode of study in secondary schools. With increasing years of study (especially 2nd and 3rd Bachelor and Master), there is an increasing preference for quickly available, anecdotal sources such as elaborated questions from older students, their own lecture notes, videos or articles from topical websites. Senior students (3rd Bachelor, 1st and 2nd Master.) are more likely to use worked-out questions and their own or shared notes.

Another interesting finding is that although not all digital resources (e.g. podcasts) are popular, videos and web articles are gaining in importance, especially in 2nd and 3rd Bachelor. Figure 2 shows the results in more detail.

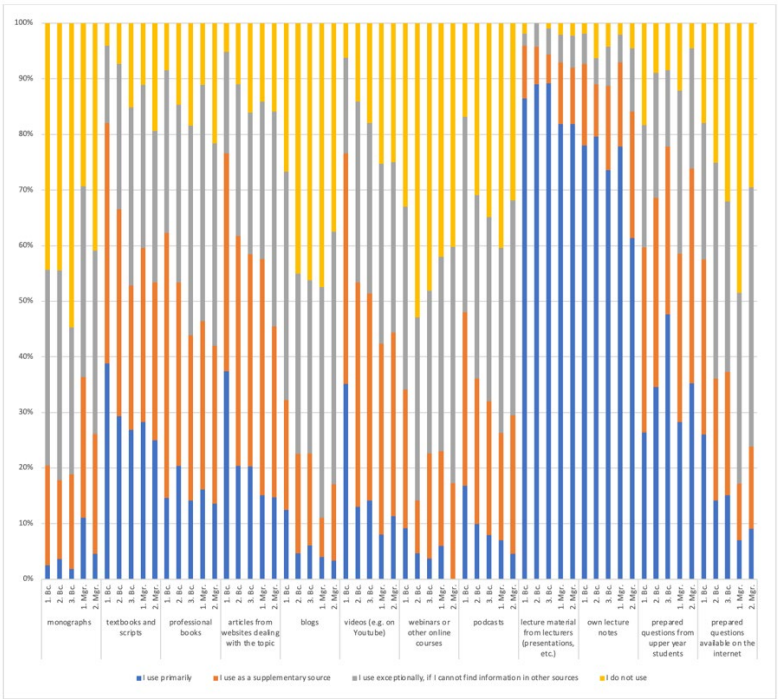

Figure 2: Resources used for study and exam preparation by year of study (n = 273 respondents - 1st Bachelor, 191 respondents – 2nd Bachelor, 212 respondents – 3rd Bachelor, 99 respondents – 1st Master, 88 respondents – 2nd Master)

The results of the survey indicate the preferred resources and their use among university students, based on which we can categorize them in the following table:

Table 1: Type of resource and trend of its use

Source of Study	Trends in Use
lecture materials from lecturers, own lecture notes	most frequently prioritised resources
articles from websites dealing with the topic, videos, elaborated questions from senior students	supplementary resources for study
professional books, monographs	rather exceptionally used resources
podcasts	least used

In terms of the way of learning, Generation Z most prefers the classical way of learning in the form of reading study materials and books. Conversely, the least preferred learning style is listening to recordings or podcasts. An interesting finding is that a significant proportion of Generation Z students prefer or partially prefer to use assignments, tasks or term papers as a learning style. This suggests a practical focus and an emphasis on linking knowledge. More detailed results are shown in Figure 3.

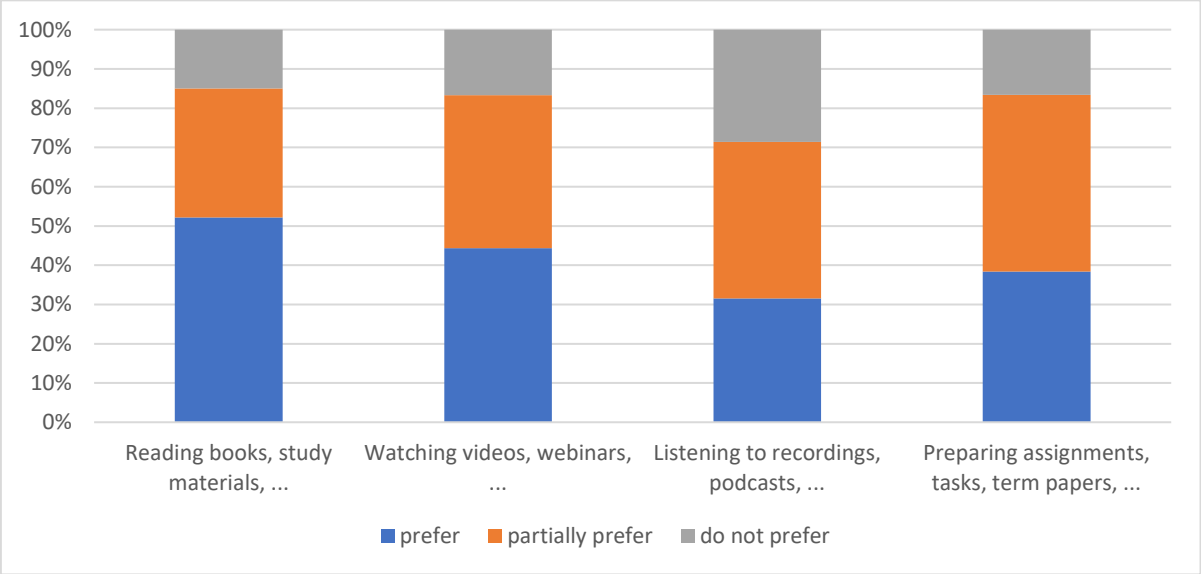

Figure 3: Generation Z's preferred mode of learning during their university studies (n = 863 respondents)

In terms of individual years, we can observe a number of trends and gradual changes in study preferences, especially between Bachelor and Master students. While the reading of study materials and books has a stable representation in the whole sample, we can see the highest preference in the 1st Master and, conversely, the lowest in the 2nd Master. We can also observe a decrease in 'partially prefer' and an increase in 'prefer' such learning style in the master's degree.

Another interesting finding is the gradual decline in watching videos and webinars as a way of learning. The highest preference can be seen among students in the 1st Bachelor studies. Subsequently, we can observe a gradual decline through the years, with the proportion of students who do not prefer this form increasing with each year.

Listening to recordings and podcasts is the least preferred way of learning, and this is the case in all years of bachelor's and master's degree, with a significantly increasing proportion of 'not preferred' in the final year of study.

Interesting findings can be seen in so-called active learning in the form of tasks, assignments or term papers. This style has a clearly increasing trend within the Bachelor studies, with the highest proportions of partial preference across all years (including Master studies). Figure 4 shows the results in more detail.

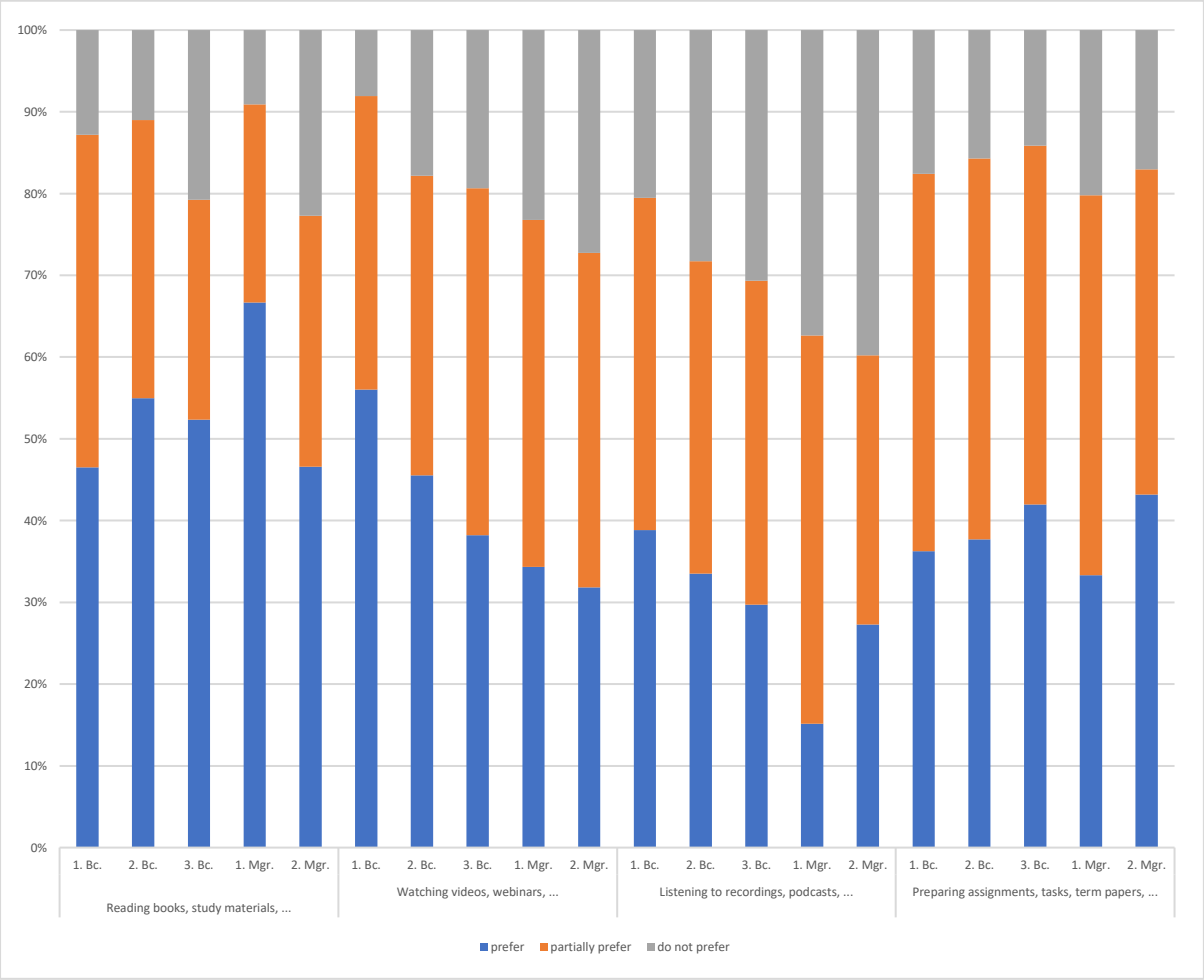

Figure 4: Comparison of the generation's preferred ways of learning during higher education by year of study (n = 273 respondents - 1st Bachelor, 191 respondents – 2nd Bachelor, 212 respondents – 3rd Bachelor, 99 respondents – 1st Master, 88 respondents – 2nd Master)

The results of the investigation indicate a trend in the learning style preferences of Generation Z students during their undergraduate studies, which can be summarised in Table 2.

Table 2: Trends in Generation Z learning style preferences during their undergraduate studies

Learning Style	Trend
Reading	Stable or increasing preference in master studies
Watching videos	Significant decrease in preference in higher grades
Listening	Lowest popularity, gradually increasing rejection
Active learning (tasks)	Increasing popularity, stronger in master degree

In terms of resources used for studying, the combined form (studying from printed materials and materials in electronic form) dominates, while we can observe a slight change in the preferences of students for bachelor's degree, namely a slight decrease in the preference for the combined form and a slight increase in the preference

for studying from electronic sources. In the case of Master, we can also observe a similar trend. More detailed results are shown in Figure 5.

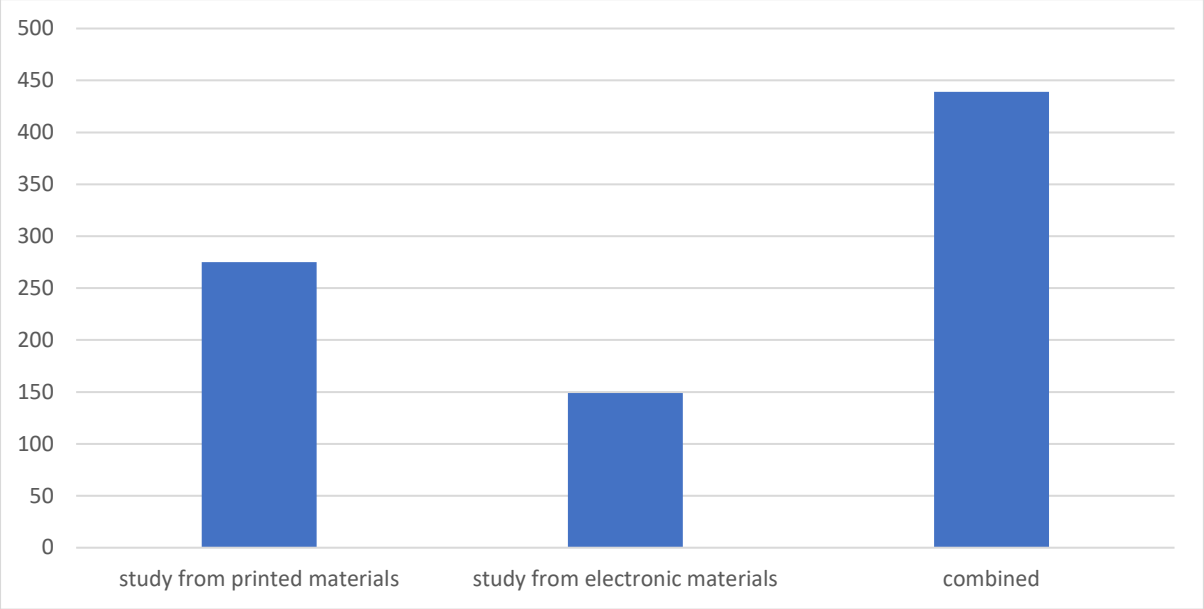

Figure 5: Preferred sources of study generation during university studies (n = 863 respondents)

When comparing preferred sources of study by year, we can observe several interesting trends. Although combined study is preferred by the highest number of students overall, the proportion of students preferring combined study gradually decreases as the year and degree level increases. However, an interesting finding is that although it is Generation Z that is digitally savvy, e-learning remains the lowest preferred form of study in every year group. Conversely, the preference for printed materials is relatively stable, with a more significant increase seen in the first year of the Bachelor studies. More detailed results are shown in Figure 6.

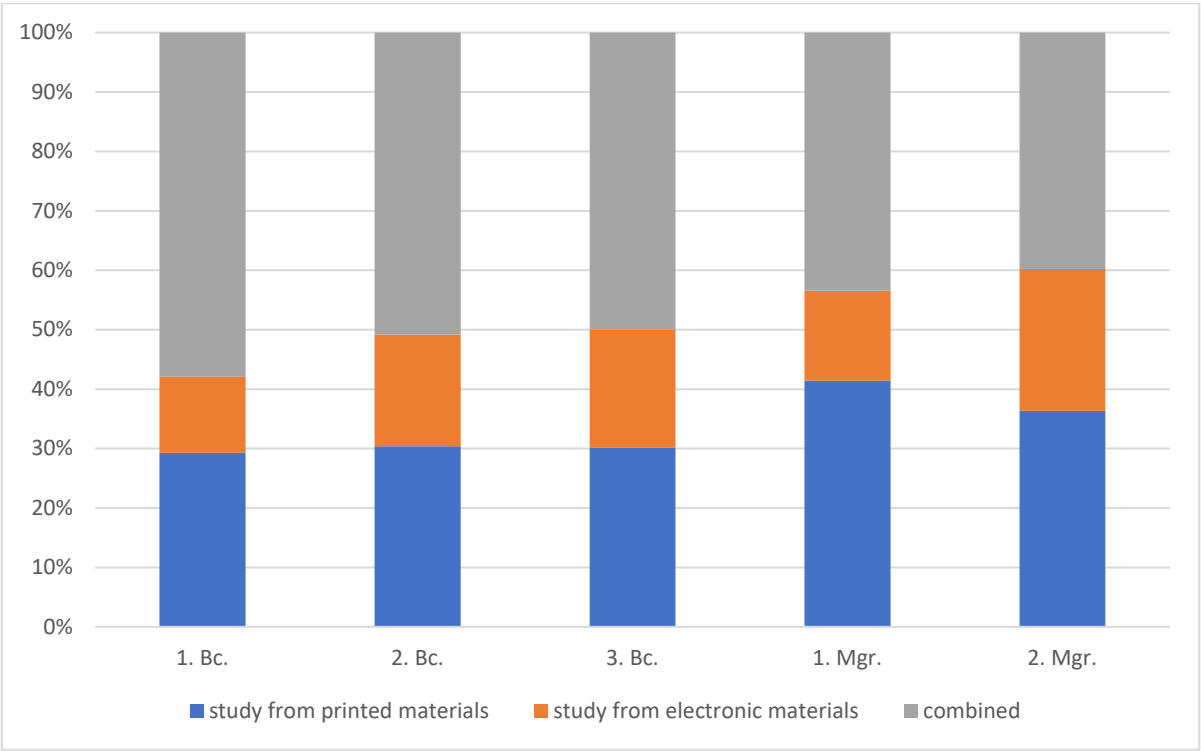

Figure 6: Preferred sources of study generation during higher education by year of study (n = 273 respondents - 1st Bachelor, 191 respondents – 2nd Bachelor, 212 respondents – 3rd Bachelor, 99 respondents – 1st Master, 88 respondents – 2nd Master)

The results of the survey indicate trends in preferred resources during undergraduate study, which can be summarised in Table 3.

Table 3: Trends in preferred resources with Generation Z during university studies

Trend	Development
Combined studies	Dominant mainly in the 1st Bachelor studies, subsequent decline across all years.
Printed materials	Stable preference within Bachelor studies, more significant increase in preference in Master studies.
Electronic materials	Slight increase in higher years, but remain the least preferred forms.

5. Conclusion

The results of the investigation have yielded several interesting insights into the current preferences of Generation Z university students in terms of information resources, learning styles and study materials used. The results show that digital resources, such as articles from websites or videos on YouTube, play a complementary but not dominant role. Materials directly from teachers and their own notes remain the most used resources, indicating a strong link to traditional and proven sources. While digital tools find use, they do not serve as a primary source.

Another interesting finding is that reading is the most preferred method of learning, confirming that despite the digital environment, Generation Z students still prefer traditional cognitive learning methods. At the same time, however, there is a significant group of students inclined towards active forms of learning - in particular task-based learning, which points to the growing importance of practice-oriented learning.

The results of the survey further revealed that the most preferred form is combined resources (print + electronic), reflecting students' desire to flexibly adapt their study habits to their current needs. While electronic resources alone are not dominant, their importance is slightly increasing, especially at higher levels of study. The findings also suggest a slight shift in preferences between levels of study, with students at Master studies more inclined towards electronic resources than their undergraduate counterparts.

The results point to an interesting fact. While Generation Z is referred to as the digital generation and several studies point to the necessity of integrating new technologies into education, learning and exam preparation are still dominated by more traditional methods and resources. This suggests that although technology is facilitating and streamlining the learning process, in the case of exam preparation and in the learning process, students themselves still prefer traditional ways with a combination of new and modern technologies as a complementary form. These findings can contribute to making higher education more effective. First and foremost, it is essential to promote the creation and systematic sharing of learning materials by educators, as these represent a primary source of knowledge. At the same time, these materials should be offered in both print and electronic formats to suit the diverse preferences of students.

Another area of application is the integration of practical assignments and term papers into teaching, which can increase engagement and link theory to practice. It is also recommended to use multimedia tools as a supplement to teach - especially for complex topics that require visualisation or demonstration.

Despite the valuable findings, the research has some limitations, particularly the focus on one group of university students, which may not reflect the preferences of all Generation Z university students. Future research should therefore extend the survey to other groups of university students and compare the results. A good complement to this is to conduct qualitative research in the form of individual interviews or focus groups, which can provide a better understanding of the reasons for students' preferences. It would also be useful to analyse the influence of the field of study on the choice of information sources or learning methods and also use the questionnaire in

other universities across the country to see of the trend is the same. Interesting might be also the comparison with the other European countries. In this respect, preferences may differ significantly. It is also important to investigate how these preferences change over time, e.g. during the transition from bachelor to master's degree or the impact of technological innovations.

Finally, it is important to track the impact of generative AI tools that are significantly changing the way information is searched, processed and applied in higher education.

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Ethics and AI Declaration

Ethical clearance was not required for the research. No artificial intelligence tools were used in the creation of this paper.

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