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***Perceptions and attitudes of the students of Babeş-Bolyai
University towards online, face-to-face, and hybrid learning during
the COVID-19 pandemic***

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Abstract: This paper presents the findings of an exploratory sociological survey conducted at Babeş-Bolyai University of Cluj-Napoca focusing on student experiences during the COVID-19 pandemic. The paper aims to investigate student experiences and attitudes toward different modes of education. Our research goals were to evaluate students' perspectives on online, face-to-face, and hybrid teaching activities, to assess the challenges they faced, to group students into clusters based on their attitudes toward online learning and to identify those factors that shape student experiences and preferences. The study utilizes cluster analysis as a methodological approach to categorize students into three groups according to their preferences for teaching modes: (1) 'Balancers' (43.5%) favored a blend of online and in-person classes, (2) 'Onliners' or

'screenagers' (28.9%) preferred online courses, as opposed to (3) the adepts of face-to-face learning (27.6%).

In spite of its challenges, online teaching was preferred by nearly 30% of the students, among whom those pursuing their master's degrees and young people coming from lower status families and thus already in employment were overrepresented. Their experiences and attitudes show that these students have indeed developed effective strategies for online education. In opposition to those who preferred face-to-face classes, 'onliners' were more likely to show satisfaction with their teachers, more likely to be better equipped for online courses and also to have passed the exams. With these results the article contributes to the scholarly and expert debate concerning the possible effects of the flexibilization of higher education upon students' access to tertiary education. We argue that for an important segment of the students, online courses provided a valuable chance to pursue their studies which they took advantage of, showing higher levels of commitment and willingness to meet the university requirements.

Keywords: higher education, COVID-19 pandemic, online education, student experience, student preference

Introduction

Within the context of digitalisation, higher education around the world is working toward innovating learning and teaching methodologies, and the unforeseen and exceptional circumstances created by the COVID-19 pandemic have accelerated this process. In March 2020, the vast majority of European universities transitioned from traditional 'face-to-face' education to various forms of digital, online learning. Although teachers and students adapted to this swift transformation and embraced its advantages, certain adverse societal consequences have become evident. These include stark manifestations of the digital divide among diverse student and faculty groups, challenges for employed students managing both work and studies, and an array of psychological issues stemming from reduced personal interactions.

In this context, the purpose of this article is to present the findings of an exploratory quantitative sociological survey conducted on a student sample at Babeş-Bolyai University (BBU) of Cluj-Napoca, Romania's largest higher education institution. A 44-item questionnaire was implemented which covered issues such as university studies at the time of answering the questionnaire, respondent experiences related to both face-to-face and virtual learning, as well as questions related to the COVID pandemic, well-being, and sociodemographic data.

The primary research objectives were the following:

- (1) to assess students' perspectives on online, face-to-face, and hybrid teaching activities and the learning challenges they were facing at the time.
- (2) to identify groups of students using cluster analysis, looking at multivariate positioning towards online learning, and examining the sociodemographic, labour market, and social background characteristics that define these identified groups.
- (3) to explore the distinct difficulties encountered by students in their online learning experiences, according to their attitudes towards online-offline teaching.

Theoretical background

The COVID-19 pandemic has profoundly impacted societies at large, as well as individual lives, shattering not only entire social and economic systems, but also people's and families' everyday practices and livelihoods. Although the impact and costs that different social groups incurred were unequal and intersectional, most people were negatively affected by the closure of several institutions and by the suspension of public and private services, from educational, social and health to sports or leisure institutions. Some of the services that were previously offered in person were replaced by virtual or online programs, and many were simply discontinued. For many people, though not for all, the pandemic's primary experience, especially that of its first wave, was that of their confinement to the private sphere. Paid work, education, as well as other activities were relegated to people's homes, and carried out using digital and online means of communication. Nevertheless, a significant share of the population has not benefitted from the possibility to pull through those months in the safety of a home, either because they were employed in the frontline or in vital sectors (Robert et al., 2023) that could not be replaced or suspended, or because they were exposed to financial, physical, or psychological hardship in their private spheres.

During the first months of the pandemic, a more optimistic approach that saw the lockdown as a living lab, a "natural experiment" (Hrubos, 2021) that would improve people's lives was particularly popular (Kortemeyer et al., 2023, Hrubos, 2021). According to this interpretation, the measures taken in this period, while doubtlessly disrupting the rhythm of everyday life, would also be able to make social injustice and inequalities visible. There were important voices in the media which questioned the taken-for-granted nature of Western consumption patterns, the social and regional inequalities they rested upon, or the consequences of neoliberal states' disinvestment from public services (Poenaru, 2021). It has quickly become obvious that social and economic status, as well as unequal access to material resources and health care would impact people's chances to tackle the challenges of the pandemic (Chung et al., 2020, Fortier, 2020). The sudden closure and unavailability of several public and market services revealed the value of service and frontline workers, while disruptions in global labor and care chains called into question the sustainability of global economy (Stevano

et al., 2021, Wiley, Sayer & Juanchich, 2021). However, as months and years passed, the commitment to an in-depth rethinking of past social and political systems faded, and a vast corpus of empirical evidence has been accumulated that showed that instead of ‘equalizing’, the pandemic would deepen social inequalities and fail to lead to a more just division of work and access to resources (Fisher et al., 2020, Fortier, 2020, Nagy et al., 2023).

Public, private, and higher education were among the most important systems affected by the suspension of face-to-face encounters. In March 2020 virtually all schools and 95% of universities worldwide closed their campuses (Hrubos, 2021). The narratives of education in the pandemic and expectations about its future were shaped by the duality described above. On the one hand, its almost complete shift to the online space was considered an emergency response that implied great losses for all participants, students and educators alike, deepening the digital divide and affecting especially students of lower social and economic background (Montacute et al. 2021, Jæger & Blaabæk, 2020, Hrubos, 2021). On the other hand, several analysts underlined that the COVID-lockdown created the momentum for the acceleration of digitalization, a process that has been unfolding for the past decade in most Western universities (Hrubos, 2021). In the following we provide a short summary of the most important costs and benefits at the individual and institutional level of universities’ switch to online teaching during the pandemic.

Since the pandemic has led to partial or total suspension of face-to-face courses and a mandatory switch to exclusively online or hybrid learning activities (Deaconu & Olah, 2022), universities around the world adopted a wide variety of solutions to replace face-to-face courses (Hrubos, 2021). In this paper, we rely on Svihus’s conceptualization of online learning or teaching and we use it as a generic term that encompasses all forms of learning on a technology platform that can be relied upon to create both synchronous (real-time video conferencing systems, real-time interactive activities) and asynchronous (pre-recorded presentations, messaging at different times) learning environments (Svihus, 2023).

Digitalization has been among the key objectives of universities across the world, as part of a general endeavor to re-conceptualize the very meanings of higher education amidst rapid global economic, social and political transformations. The urge to rely more

heavily on digital solutions is driven by the attempt to make higher education more inclusive in terms of social class and regional background, and to better adapt educational programs to the needs of the labor market. In this respect, the “flexibilization” of higher education, within which online courses and degrees or “micro degrees” are offered, may contribute to the lowering of thresholds, to “upskilling” and to improving access for “second chance learners” (Hrubos, 2021, Farrell & Brunton, 2020). However, the flexibilization of higher education might have its pitfalls, represented in high dropout rates, varying quality, or the lack of recognition of such degrees by employers (Hrubos, 2021).

Similarly to the ambivalent effects of digitalization on the functioning of universities, its consequences for students are manifold. Some institutions, or faculties within universities, already had online education programmes in place, and both teachers and students had received training (Almahasees et al., 2021) which greatly facilitated the adaptation to the forced shift to online education that occurred during the COVID-19 outbreak. For others, the transition was so unexpected that they simply tried to transfer face-to-face education to the online space (Svihus, 2023; Tang et al., 2021) and progressively adapt to distance and online teaching. Higher education institutions had different experiences with online operations and education before 2020. Digitalization of higher educational processes has been carried out since the 80s and the 90s in the institutions of the Global North, but it has been conceived and implemented on two levels. On one level, it involved administrative, communication, and HR processes where results were more obvious. On the other level, in teaching activities, a so-called dual digitalization has been under way: one carried out by IT-departments and aiming to create digital solutions for online learning (learning management systems, MOOCs, digital libraries etc.) and the other, more content-oriented effort by researchers and teachers, working towards the setting up of digital subjects (Bygstad et al., 2022). These two levels have been developed in parallel, creating a more fragmented approach. Bygstad et al. (2022) claim that a more integrated conceptualization of digitalization, where “digital learning spaces” are being developed on multiple — technical, scientific, pedagogical and organizational — levels, improves its efficiency.

There has been a growing body of research focusing on how the shift to online education during the pandemic affected students already enrolled at university. Most of

these studies prioritized topics such as mental health, individual differences (in terms of personality or digital literacy) in coping with challenges, or the role of social background in tackling digital teaching. Among the personal traits that were found to have a positive impact on students' coping strategies researchers identified self-regulation, self-organization and flexibility (Kortemeyer et al., 2023), while on the other hand social and economic background through access to equipment, a proper study space and financial support also determined students' ability and success to adapt to online studying (Butnaru et al., 2021; Montacute et al. 2021).

According to studies on the impact of remote instruction on students, carried out both before and after COVID-19, there are several strategies teachers can apply to efficiently address student needs and increase their commitment to online courses: students usually appreciate if several types of tasks are included in a course, if the setup allows for a wide variety of interactions between participants, and if a course design creates and builds on various student groups, thus preventing their isolation (Farrell & Brunton, 2020). A different study underscored a number of advantages of digital learning for both students and teachers: increased autonomy, flexibility, convenience and access, and whenever discussion forums are provided, communication between students and teachers is also improved. Other studies on educational processes during the epidemic concluded that both university students and teachers saw online learning as a flexible and useful learning option that helps to maintain continuity in educational work, even in extreme circumstances such as those during the COVID-19 crisis (Almahasees, et al., 2021, Jayanthi & Rajalakshmi, 2022). Accessibility (even from geographically isolated regions), comfort, flexibility, cost and time efficiency, and the ability to control the learning environment are major contributors to the usefulness of online learning over time (Abbasi et al., 2020; Almahasees et al., 2021; Dhawan, 2020; Khalil et al., 2020; Martín-Blas & Serrano-Fernández, 2009; Riaz et al., 2023). The advent of online learning has fostered a paradigm shift towards self-directed learning, wherein the student assumes an active role in the educational journey. Students are actively engaged in the pursuit of gaining or cultivating additional competencies, such as time management and self-discipline (Almahasees et al., 2021).

However, several challenges and potential barriers were highlighted. These findings indicate that online learning, even synchronous videoconferencing, cannot

completely substitute traditional in-person learning (Lee et al., 2023). Among its costs, the same research found that distance teaching and learning is much harder work and can easily lead to burnout. If not sufficiently prepared for it, teachers are likely to fail in their attempt to deliver meaningful and efficient courses, while students are very likely to face isolation and to experience a weaker sense of belonging, self-discipline, and efficiency (Soliman et al., 2022). The research conducted by Maqableh and Alia (2021) investigated the responses of undergraduate students to online learning in the context of the COVID-19 pandemic, also assessing its advantages and disadvantages for them. Two online questionnaires were administered to evaluate online learning, student happiness, and the advantages and disadvantages associated with the former. The initial survey encompassed data collected from a total of 483 participants subsequent to the transition to online learning in response to the emergency situation. The second survey was conducted among a sample of 853 students who had undergone three consecutive semesters of online courses. The findings indicate that students faced multiple obstacles when transitioning to online learning during the COVID-19 pandemic. The main challenges identified by the students were technological difficulties, psychological issues (around 80%), mental health problems (around 50%), financial problems (nearly 50%), time management (over 50%), and the need to balance studies and private life (about 60%). Half of the student population reported dissatisfaction with online learning, with an increasing trend over time (increasing from 41% to 50.3% between the two measurements). The primary determinants contributing to students' discontent in the context of online learning include distractions and diminished concentration, poor interaction between peers, students, and teachers (similar results found by Almahasees et al., 2021; Riaz et al., 2023), psychological challenges (boredom, anxiety, and frustration), and management-related concerns. Students also mentioned loneliness and isolation as problems that they associate with the increased workload during online learning.

According to the study by Maqableh and Alia (2021), the main positive aspects of online learning reported by students can be categorized as follows: effectiveness (time and cost of transportation saved), health and safety (reduced risk of contracting the COVID-19 virus), convenience (ability to attend classes from home and have control over course materials online), and increased participation (facilitated by the ease of accessing recorded classes and course materials). Being prepared for online learning promotes

student engagement, which, together with teachers' active involvement, social presence, support, and interaction increases student satisfaction (Alenezi, 2022; Jayanthi & Rajalakshmi, 2022).

When, in general, students report a lower level of motivation during the pandemic period (Almahasees, et al., 2021, Aguilera-Hermida 2020), this study shows a difference in perception between the two study levels, with master's students being more motivated to participate in courses, seminars, or labs, compared to undergraduates. Regarding obstacles to involvement in distance learning and potential dropout, a large percentage of students (more than a quarter at bachelor level and 20% at master level) stated that they encountered problems due to material causes, such as lack of equipment or adequate internet connection. The educational institutions were not very likely to provide any material support for these students. The risk of dropping out was predominantly high among bachelor students (15.3% compared to 11.5% in the case of master's students).

In Romania, a series of sociological studies have been carried out in different universities, especially during the first phase of the pandemic, evaluating the experiences and attitudes of students and teachers towards educational transformations. For example, the National Student Survey, a large survey conducted among 23,706 respondents from 76 higher education institutions, collected students' perceptions of the transformation of higher education, their satisfaction with the quality of the study programme and with the services offered by the university during the pandemic period, and showed a high level of student satisfaction in general (Deaconu & Olah, 2022; Olah et al., 2022). At the beginning of the lockdown, a different online survey was carried out in Iaşi among students from the Faculty of Philosophy, Sociology and Political Science which pointed to general dissatisfaction among students with the strategies of their teachers to address the pandemic, leading to concern for their future (Apostol, 2020). In a somewhat later research, Butnaru et al. (2021) demonstrated that social background shaped students' chances to meaningfully participate in digital education.

Starting with 2021 and with the availability of the vaccine on a larger scale, universities have gradually reopened their gates and allowed for a return to the classrooms – albeit these decisions were just as varied as initially the ones that switched to digital education. Policy and decision makers at all levels relied on data, as well as on their own experience, when trying to propose an optimal combination of classroom and

digital learning. By 2021 and 2022 it has become obvious in most cases that technology in itself does not address old inequalities of the educational system (Facer & Selywn, 2021), especially in a neoliberal context. However, according to a Swiss study, digital or classroom education could not be evaluated as efficient in themselves, but depends on the specific situation of students, who seemed to be able and willing to choose rationally, according to their study needs and life possibilities, the form of education that ensures that they benefit from the educational offer (Kortemeyer et al., 2023). Our research aimed to investigate a similar question, that is, students' experiences and perceptions of online and offline education and their preferences for their future years of study.

Methodology

1. Research questions and hypotheses

The consequences of the shift of higher education to digital teaching can be explored on multiple levels, from social, economic, or institutional to the personal, where its impact on faculty and on students are both relevant. In addition to the complex impact it had on students' mental health, personal or professional status, it is equally important to investigate the students' assessment and perception of online and face-to-face courses. As part of our attempt to explain their perceptions of and preferences for one form of learning or another, in our paper, we test two hypotheses:

H1. Preferences for different online or offline forms of teaching are determined by students' financial and social background.

H2. Participation in paid employment and higher degree level (MA/MSc) increases the likelihood of preferring online teaching at the university.

2. Data sources

Our research targeted the population of students enrolled at BBU in the academic year 2021-2022, pursuing bachelor's or master's studies on a full-time basis, in Romanian, Hungarian and German.

Data collection was conducted online, using a 44-item questionnaire that covered aspects such as university studies at the time of filling in the questionnaire, respondent's experiences related to both face-to-face and virtual learning, issues related to the Coronavirus pandemic, as well as well-being and socio-demographic data. The questionnaire, available both in Romanian and Hungarian, was developed by members of the Faculty of Sociology and Social Work in collaboration with experts from BBU's Qualitas Centre. The data collection interval was 24 May–22 June 2022.

The students were contacted by email and were also encouraged through social media posts or by their departments to take the survey, and were offered incentives such as tickets to popular festivals. Students' email addresses were provided by BBU's Directorate of Information and Communication Technology (DTIC), but responses were anonymous. The responses were collected using the QuestionPro platform. Given that the questionnaire was sent to all active students instead of just a sample, the data collection can be considered exhaustive. The final sample consisted of 2,732 respondents.

The sample was weighted by faculty, degree level, and the language of study. The weights ranged from 0.5 to 3, but for most faculties the values were close to 1 (between 0.7 and 1.5). These weights were calculated as the ratio of the number of students in the university's faculties in the academic year 2021/2022 to the total number of students in BBU. Both the students' gender distribution and the distribution by degree level were checked and validated, with the percentages in the sample showing very small variations compared to those in the total BBU student population. The final number of cases following the weighting procedure is 2,572. This sample is representative of BBU's student population and the maximum permissible error is approximately 2.5%.

Results

The majority of the students who took the survey was formed by young women pursuing their bachelor's degree in Romanian, aged on average 23.6 years and studying either economics, business, psychology or political science. Most of the students in our sample were not originally from Cluj, in fact almost 10% were from abroad, but by the

time the research was concluded two-thirds returned to Cluj. Moreover, two-thirds of the respondents came from families where the father's highest education was secondary school and most of the students themselves were still single (see Table A1 in the Annex).

Cluster Analysis

To explore students' experiences and evaluation of their own coping strategies with online education we asked them two sets of questions made up of 4 items each in which they had to assess the degree to which they were able to benefit from online courses, compared to classes held in person. Although data were collected in Spring 2022, the respondents were asked to evaluate courses held in the previous, fall semester. The responses for each of the items are included in Table 1.

Table 1. Students' evaluation of different online and offline education experience (%) (N=2,466)

Variables	Entirely disagree	Rather disagree	Rather agree	Totally agree	Sum
When there is online education, the amount of schoolwork increases.	12.2	30.2	38.8	18.8	100
I understand the material better online than in face-to-face classes.	28.8	30.8	26.1	14.3	100
When I have online classes, I can manage my time better.	6.7	9.9	30.1	53.3	100
I feel less motivated during online classes than during face-to-face classes.	26.3	22.2	24.3	27.2	100
My teachers were prepared and used digital teaching methods well.	3.0	11.7	46.4	38.9	100
My teachers took into account that teaching online is different from teaching in the classroom.	3.4	14.0	44.4	38.2	100
My teachers gave appropriate feedback on homework, assignments, submissions, projects.	3.7	14.2	42.3	39.8	100
The online exams were a good way to assess my knowledge.	10.1	20.5	35.7	33.7	100
My teachers understood the possible problems of the students.	4.6	15.8	43.8	35.8	100

Source: Online survey, Babeş-Bolyai University 2022 (own calculations)

In the next step, we conducted a hierarchical cluster analysis using the variables presented above. Cluster analysis was performed using the Ward method and, based on

the dendrogram of the model, three clusters were retained which were sufficiently consistent and relevant to students' attitudes toward online education in relation to the Covid-19 Pandemic. The three groups are the following: The first group was composed of those who prefer blended education, i.e., a combination of online and face-to-face classes. This group accounted for 43.5 percent of the respondents and was the largest group. The second group is that of those who prefer online education, accounting for 28.9% of respondents, while the third one was made up of students (27.6 per cent) who felt the most comfortable with face-to-face education.

The three clusters can be thus characterized in the following way:

1) *'Balancers' (43.5 per cent), that is, those who preferred a combination of online and classroom classes*, developed better time management during online instruction, although they did not feel they had a better understanding of the subject matter. In terms of motivation, they were more similar to those who prefer face-to-face instruction, feeling less motivated during online instruction, however, they evaluated the online courses of their teachers rather positively, both in terms of preparation, use of digital teaching methods, and online examination.

2) *'Onliners' or 'screenagers' (28.9 per cent)* had not experienced heavier workload during online teaching, also reporting that they had understood the course material better in online classes. From an organizational point of view, these students had experienced an improvement in their time management and a boost in motivation during the period of online teaching. Just like the members of the previous group, they were satisfied with teachers' preparedness for the classes, with the way they had used digital teaching methods and how online exams were able to assess students' real knowledge.

3) *Adepts of face-to-face learning (27.6 per cent)* were motivated in their preferences by the experience that online teaching generally tends to increase the number of tasks for students. They felt less motivated during online instruction and were less able to manage their time or to understand the course material. Still, they were satisfied with their teachers' digital competences, although not to the same extent as 'onliners'. They were also less convinced that online exams were suitable for assessing the student's knowledge.

The sociodemographic profiles of the three clusters are different. Preference for online education seems to be connected with age, level of degree, marital, and social status: older and lower-class students are more likely to find digital teaching more

beneficial. By age, it can be seen that 19 to 22 year-olds prefer a mixed mode of education, while those aged 23 and upwards prefer online education, the latter being the ones who are more likely to be married. Those who prefer face-to-face education are also more likely to be single, aged 22 and under. One main feature is striking relating to the educational attainment of the father: children of unskilled fathers with only primary education are much more likely than others to choose online education (7,6%), which is also related to financial situation, as we will see. By respondents' mother tongue, we observe that Hungarian speakers prefer face-to-face education in much higher proportions (35.0%) than the Romanian-speaking majority (Table 2).

Table 2. Sociodemographic profile of the students, by clusters (%)

	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face-to- face learning (27.6%)	Total	Cramer's V
Age group**					.222
19-20 years old	27.1	20.5	31.0	26.2	
21-22 years old	38.2	24.4	44.7	36.0	
23-24 years old	20.4	20.3	17.1	19.5	
25-30 years old	7.9	13.9	5.4	9.0	
Over 30	6.4	20.9	1.8	9.3	
Total	100.0	100.0	100.0	100.0	
Marital status**					.194
Single, no relationship	41.0	32.2	51.1	41.3	
In a relationship ("seeing someone") but living separately	34.9	26.9	34.4	32.4	
In a relationship and living with my partner	17.4	22.3	13.1	17.6	
Married	6.0	17.1	1.3	7.9	
Divorced	0.5	1.4	0.1	0.6	
Widowed	0.5	1.4	0.1	0.6	
Total	100.0	100.0	100.0	100.0	
Father's education*					.072
Primary school (8 grades) or less	4.1	7.6	3.3	4.9	

	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face-to- face learning (27.6%)	Total	Cramer's V
Father's education*					
Vocational school (no school leaving certificate)	24.8	21.3	22.5	23.2	0,72
Secondary education	29.5	33.1	34.5	31.9	
Post-secondary school, technical school, other non-university education	10.4	8.6	8.7	9.4	
University	20.1	20.3	20.9	20.4	
Postgraduate education (master or doctorate)	11.1	9.0	10.2	10.3	
Total	100.0	100.0	100.0	100.0	
Language of the survey**					.245
Romanian	81.9	90.8	65.0	79.8	
Hungarian	18.1	9.2	35.0	20.2	
Total	100.0	100.0	100.0	100.0	

* $p < 0,05$; ** $p < 0,01$; Gender, Type of settlement, Type of municipality not significant.
Source: Online survey, Babeş-Bolyai University 2022 (own calculations)

On the one hand, the variables of the learning situation confirm the previous findings: preference for online education increases with age and degree level. The relationship between the age of the respondents and their preferences implies that bachelor's students tend to prefer face-to-face instruction, while master's students are more likely to prefer online and mixed modes of instruction. By field of study, differences are less significant, students in natural science, sport and humanities preferring more face-to-face education, while students in economics and social sciences prefer more online education (Table 3).

Table 3. Study characteristics of the students, by clusters (%)

Variables	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face-to- face learning (27.6%)	Total	Cramer's V
Level of degree**					.149
Bachelor' degree	77.4	66.9	83.5	76.1	
Master's degree	22.6	33.1	16.5	23.9	
Total	100.0	100.0	100.0	100.0	
Field of study**					.071
Mathematical Sciences	11.9	8.4	11.0	10.7	
Natural Sciences and Sports	11.9	9.1	14.0	11.7	
Economics and Law	32.6	35.9	29.0	32.5	
Social Sciences	29.8	33.4	28.7	30.5	
Humanities	13.8	13.2	17.2	14.6	
Total	100.0	100.0	100.0	100.0	
Where did you live during the first semester of the academic year 2021-2022?*					.179
Mostly in Bucharest	0.4	2.1	0.4	0.9	
Mostly in Cluj-Napoca	58.5	38.5	70.1	55.9	
Mostly in another Romanian city	24.3	36.6	17.5	26.0	
Mostly in a Romanian village or town	14.6	19.5	11.0	15.0	
In a large city abroad	2.1	3.4	0.9	2.1	
Total	100.0	100.0	100.0	100.0	

* $p < 0,05$; ** $p < 0,01$

Source: Online survey, Babes-Bolyai University, 2022 (own calculations)

The role of social-material status in online education preferences is confirmed by the answers to the question on the subjective assessment of the size of the total family income. To start with, among those who preferred classroom education the probability to be based in Cluj at the time of the survey was nearly double, compared to “onliners”. There are further significant differences between “onliners” and the adepts of face-to-face learning in terms of the financial background provided by their families. The share of those students who evaluate their families’ material status rather negatively (that is, the first three options) among the “onliners” group is more than 10 percentage points higher than among the face-to-face adepts’ group. Similarly, those students who were more

satisfied with online teaching were more likely to come from families which were hit harder by the pandemic and almost twice as likely as the ones who prefer classroom learning to be in employment. Students' paid work is presumably one of the most decisive factors to shape preferences for one teaching mode or another. Generally, an increasing share of students has taken up paid work during the past years. In March 2020 nearly one third of BBU students were in some sort of employment, which has seen a significant boom during and due to the pandemic: by the Spring of 2022 44% of students were working. If employed, onliners on average work 10 hours more per week than those who prefer face-to-face classes, but are less likely to have flexible schedules (Table 4).

Table 4. Financial characteristics and economic status of students, by clusters (%)

	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face- to-face learning (27.6%)	<i>Total</i>	Cramer's V
Where do you currently live**					.213
Cluj-Napoca	69.9	44.5	81.2	65.7	
My permanent residence (outside Cluj-Napoca)	26.5	48.1	15.6	29.7	
Other place than permanent residence	3.6	7.4	3.2	4.6	
Total	100.0	100.0	100.0	100.0	
Accommodation arrangement in Spring 2022 (of those based in Cluj-Napoca?**))					.139
At home with my family	11.2	16.6	7.2	10.9	
I live in university residence	25.6	16.3	29.1	25.0	
In a rented home, alone	10.5	14.7	7.6	10.4	
In a rented home, with others	43.0	36.7	48.6	43.7	
In my own or family apartment, alone or with others	8.1	13.2	6.9	8.7	
Elsewhere	1.5	2.5	0.5	1.4	
Total	100.0	100.0	100.0	100.0	
How do you rate your family's total income?**))					.064
Not enough for basic needs.	2.9	2.9	2.1	2.7	
Only enough for basic needs.	9.4	10.1	6.7	8.9	
We live acceptably, but we can't afford to buy more expensive things.	27.7	33.9	28.9	29.8	
We can buy more expensive things if we cut back on other spending.	51.3	46.8	52.6	50.3	

	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face- to-face learning (27.6%)	Total	Cramer's V
How do you rate your family's total income?**					
We can buy everything we need without cutting back.	8.8	6.3	9.7	8.3	
Total	100.0	100.0	100.0	100.0	
How has the epidemic affected your family financially?**					.066
The epidemic has affected us very negatively financially.	7.1	11.3	7.2	8.4	
Rather negatively affected financially by the epidemic.	41.1	41.7	42.4	41.7	
The epidemic has not affected us financially.	46.6	43.1	46.5	45.6	
Rather positively affected financially by the epidemic.	4.9	2.9	3.4	3.9	
Very positively affected financially by the epidemic	0.2	0.8	0.4	0.4	
Total	100.0	100.0	100.0	100.0	
Have you worked in the last 4 weeks in addition to your university studies?**					.208
Yes	40.4	59.7	33.6	44.1	
No	59.6	40.3	66.4	55.9	
Total	100.0	100.0	100.0	100.0	
On average, how many hours a week did you work at the time of the survey?					
Average working hours per week (F=34,3***)	27.8	33.1	23.3	28.9	
Flexibility of work**					.163
I have a fixed schedule, it is not flexible.	27.0	39.2	20.6	30.5	
The schedule is partially flexible.	45.3	45.3	39.9	44.2	
The schedule is totally flexible.	27.7	15.5	39.5	25.4	
Total	100.0	100.0	100.0	100.0	

**p<0.01 level significant associations (Chi-square)

Source: Online survey, Babeş-Bolyai University, 2022 (own calculations)

Experience seems to shape preferences, as those students who were more satisfied with online education were also more exposed to it during the semester which

preceded our survey. Also, if being offered the possibility, those who developed adequate strategies to tackle online learning would continue to pursue their studies online even after the pandemic (Table 5).

Table 5. Online education experiences and preferences, by clusters (%)

	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face-to- face learning (27.6%)	<i>Total</i>	Cramer's V
How was the education delivered in the first semester?***					.141
Exclusively online	64.8	74.8	57.0	65.5	
Mixed, hybrid mode	35.2	25.2	43.0	34.5	
Total	100.0	100.0	100.0	100.0	
If you had to choose, what form of teaching would you choose for the next academic year?***					.410
Online (100%)	24.3	64.7	8.7	31.8	
Traditional face-to-face (100%)	25.5	3.1	59.5	28.5	
Hybrid, mixed education	50.2	32.1	31.8	39.8	
Total	100.0	100.0	100.0	100.0	

* $p < 0,05$; ** $p < 0,01$, *** $p < 0,001$

Source: Online survey, Babes-Bolyai University (FSAS), 2022 (own calculations)

Table 6. Technical conditions of participation to online education by clusters

Questions		Balancers (mixed education) 43,5%	Onliners/ Screenagers/ 28, 9%	Adepts of face- to-face learning 27,6%	Total
What did you participate in online classes with?					
smartphone	often	21.7	23.6	17.9	21.2
	every time	12.7	18.8	7.5	13.0
computer or laptop	often	34.4	30.6	39.9	34.8
	every time	54.9	58.1	49.6	54.4
tablet	often	2.0	4.1	1.8	2.5
	every time	.6	1.7	.9	1.0
To what extent were the following resources available to you last semester under acceptable conditions?					
Functional	To a large extent	13.5	11.2	16.9	13.8
computer/laptop***	Totally	82.8	85.4	77.5	82.1
Specific software we have studied ***	To a large extent	25.6	19.5	29.1	24.8
	Totally	50.1	59.7	46.9	52.0
Video camera***	To a large extent	19.7	19.1	20.7	19.8
	Totally	70.4	70.5	65.5	69.1
Microphone*	To a large extent	17.1	13.9	18.6	16.6
	Totally	75.0	78.9	71.1	75.0
Bibliography available online**	To a large extent	41.1	36.0	44.2	40.5
	Totally	39.7	51.9	32.6	41.3
Functional internet connection***	To a large extent	38.8	24.7	41.7	35.5
	Totally	53.5	71.5	44.9	56.3
Quiet room***	To a large extent	39.3	29.5	40.3	36.7
	Totally	46.8	63.1	36.5	48.7
Quiet family or home climate***	To a large extent	34.5	25.8	40.4	33.6
	Totally	55.5	68.2	38.5	54.4
	Total ¹	100	100	100	100

Obs. 1 The percentages up to total 100% are composed by the answers 'not at all', in 'small part', by columns.

* p<0,05; ** p<0,01, ***p<0,001

Source: Online survey, Babeş-Bolyai University, 2022 (own calculations)

From a technical point of view, a higher proportion of online cluster members always joined classes online, on a computer, which shows that they were better prepared to participate actively. Also, in terms of the technical conditions of online education, we observed a higher proportion of better equipped members in the onliner cluster, both in

terms of functional computer/laptop and software or other accessories (camera, microphone), their online access to literature being significantly better than that of the face-to-face enthusiasts cluster (see Table 6.)

As might be expected, there was a marked difference in the extent to which members of the onliner cluster actively participated in online education and that they took it much more seriously than members of the face-to-face cluster. The majority of “onliners” actively participated in the interactive classes, doing no or less other activities during the lessons than the face-to-face cluster, the majority of whom (60%) engaged in other activities during the online lessons (playing games, working, searching on the Internet, etc.) (see Table 7.)

Table 7. Personal satisfaction with online education, by clusters (% by columns)

Questions	Options	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face-to- face learning (27.6%)	Total
In interactive classes I actively participated and contributed to discussions***	Characteristic to a large extent	38.1	42.0	27.9	36.4
	Total characteristic	13.6	25.4	7.5	15.3
I did not always manage to pay attention in class.***	Characteristic to a large extent	37.4	15.0	43.8	32.7
	Total characteristic	10.7	4.5	23.1	12.3
I attended class, but at the same time I was busy with something else (games, work, searching the internet, cooking, etc.).***	Characteristic to a large extent	33.3	16.5	41.0	30.6
	Characteristic total	8.5	6.9	19.3	11.0
Total ¹		100	100	100	100

Obs. 1 The percentages up to total 100% are composed by the answers 'not at all', in 'small part', by columns.

* $p < 0,05$; ** $p < 0,01$, *** $p < 0,001$

Source: Online survey, Babeş-Bolyai University, 2022 (own calculations)

According to the data presented in Table 1 members of the online group also assessed teachers' performance in a radically different manner, evaluating it better than those who preferred face-to-face teaching: 71.5 percent of the former group strongly agreed that teachers were well prepared and used online teaching tools well, compared to 10% of the latter. Onliners were much more likely to perceive their teachers as understanding, and were also much more likely to be largely or completely satisfied with the organisational performance of the faculty (85%) than those who preferred face-to-

face teaching (56%). The fact that behind stronger preferences for online classes lays better strategies to tackle its challenges can be proved by two additional pieces of data. On the one hand students who were more exposed to online education and were also more in favor of it, are less likely to experience a strong conflict between study and private life, although they are also more prone to work. On the other, we found that, to a small but significant degree, the success rate at school was also higher for onliners, based on the percentage of students who passed the exams (17.4 versus 11.8%, see Table 8).

Table 8. Evaluation of teacher performance in online education by clusters (% , by columns)

To what extent do you agree with the following?	Options	Balancers (mixed education) (43.5%)	Onliners/ Screenagers/ (28.9%)	Adepts of face-to-face learning (27.6%)	Total
Learning affects your private life.	Often	20.8	16.2	23.5	20.2
	Always	6.1	5.3	8.8	6.6
How do you rate the way the Faculty has managed the relationship with students in organisational matters?***	I am rather satisfied.	59.4	54.3	49.5	55.2
	I am completely satisfied.	15.7	31.0	6.7	17.6
Passed all exams in last semester (Pandemic)***	Yes	15.7	11.8	17.4	15.0
	No	84.3	88.2	82.6	85.0
	Total ¹	100	100	100	100

Obs. 1 The percentages up to total 100% are composed by the answers 'not at all', in 'small part', by columns.

* $p < 0,05$; ** $p < 0,01$

Source (all tables): Online survey, Babeş-Bolyai University, 2022 (own calculations).

Discussion and conclusions

The sudden and radical transformations caused by the pandemic affected the structural conditions of people's daily lives, including paid and unpaid work, as well as their access to basic services. Education, and within it, higher education, was one of the major social systems that was compelled to react quickly and fundamentally by reducing physical contact. The closing of campuses and the switch to remote instruction have been interpreted during the months and years of the pandemic with the same ambivalence that has shaped societies' attitudes to lockdown in general. Although most experts and stakeholders warned about the pitfalls and negative consequences of education lacking personal encounter, there were also voices who argued that the lockdown just accelerated the necessary and unavoidable digitalization of higher education. Therefore, the pandemic has been seen primarily in terms of momentum for higher education reform, which was thought to strengthen teachers' digital competences and equalize the access of lower-status students to university degrees.

Our paper aims to contribute to the understanding of this dilemma by investigating student experiences and attitudes about different types of education during the pandemic. For this, we conducted a case study in Romania's largest higher education institution, Babeş-Bolyai University from Cluj-Napoca in Spring 2022, through an online survey among bachelor's and master's students. The timing of our study is special, as data collection was carried out in the period when all institutions were gradually reinstating face-to-face interactions, but both universities and teachers were granted significant autonomy to decide the extent to which they were willing to return to classrooms. The retransition to in-person functioning was not without tensions, however: some people were still considering the threat of the virus significant, others, especially students, were either working or lacking proper accommodation in the location of their university.

The present analysis focuses on students' evaluation of the teaching methods that had been used during the first semester of the academic year 2021-2022, and of their own coping strategies, attempting to understand the conditions that shaped students' preference for online or face-to-face education. In particular, we were interested to find out how students assessed their own participation in courses and to identify the factors

that determined their attitudes toward these methods of teaching. In line with previous findings, we tested two hypotheses, which assumed that students of lower social and economic status and those who were taking up paid employment during university studies were more likely to embrace online courses.

Using cluster analysis, we have grouped students into three groups according to their preferences of online, face-to-face or mixed teaching modes. Students who preferred online or blended teaching were those with a financially more vulnerable family situation, while students from better-off families were over-represented in the group with preferences for face-to-face teaching. We also showed that working students preferred online or hybrid teaching more than the rest. It was found as well that older students preferred online teaching methods, most of them studying at master's level.

Our paper brings an important contribution to the scholarly and expert debate on the potential costs and benefits of lowering the threshold of entry to higher education. In contrast to expectations that the digital divide would increase the gap between lower and higher status students in access to online courses, due to a lack of proper technical means or inflexible work schedules, we found the contrary. Although they continued to work, 'onliners', where students of poorer social status and Master's students are over-represented, were better prepared technologically and had better access even to study materials and software. Furthermore, they were more satisfied with their participation and, indeed, passed their first semester exams in higher shares compared to the group that preferred face-to-face courses.

In conclusion, we argue that by the end of the COVID pandemic approximately one third of the students of Babeş-Bolyai University have developed proper strategies to tackle the challenges of online or blended education. Based on our data, we claim that online education provided a real study opportunity for an important group of 'second chance learners' and also that most of them responded with a higher level of motivation and readiness to meet teacher expectations. Therefore, the conditions under which digitalization can improve access to higher education need further and more careful exploration.

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*Annexes***Table A1.** Social demographic characteristics of the sample (%)

level of education	
<i>Bachelor's</i>	76.5
<i>Master's</i>	23.5
language of study	
<i>Romanian</i>	70.9
<i>Hungarian</i>	18.6
<i>other</i>	10.3
year of study	
<i>1</i>	45.6
<i>2</i>	31.9
<i>3</i>	20.6
<i>4</i>	1.1
<i>study extension</i>	0.8
age	
<i>19–20</i>	25.9
<i>21–22</i>	36.5
<i>23–24</i>	19.5
<i>25–30</i>	8.9
<i>31 years and over</i>	9.2
gender	
<i>male</i>	26.6
<i>female</i>	72.9
<i>no response</i>	0.5
marital status	
<i>Not in a relationship</i>	41.3
<i>In a relationship (with boyfriend/girlfriend), but living separately</i>	32.3
<i>In a relationship (with boyfriend/girlfriend) and living together</i>	17.7
<i>Married</i>	7.9
<i>Divorced, widowed</i>	0.8
type of locality	
<i>County town</i>	40.9
<i>Other city in county of residence</i>	25.3
<i>A commune/village in the county of residence</i>	33.8
father's highest education	
<i>Elementary school (8 grades) or less</i>	4.9
<i>Vocational school (without baccalaureate)</i>	23.1
<i>High school (theoretical, vocational, etc.) with baccalaureate</i>	31.7
<i>Post-secondary, other pre-university courses</i>	9.4
<i>University, undergraduate level</i>	20.5
<i>Master's or doctorate</i>	10.3

Self-Compassion Mediates the Relationships Between University Students' Mindfulness, Dysfunctional Attitudes, and Various Distress and Well-Being Indicators

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Abstract: *Objective:* The current study intended to model the relationships between mindfulness, dysfunctional attitudes, and self-compassion in predicting university students' various indicators of emotional distress and well-being of university students. We aimed to examine the mediative role of self-compassion and the mediative roles of self-coldness and self-warmth in these relationships.

Methods: Applying a correlational design, validated instruments were used to measure mindfulness, dysfunctional attitudes, self-compassion (and its two main components: self-warmth and self-coldness), various indicators of emotional distress (i.e., negative affect, depression, anxiety, stress), and well-being (i.e., soothing positive affect, activating positive affect, satisfaction with life). The final sample consisted of $N = 176$ university students. The proposed models were tested by SEM (structural equation modeling) using SPSS AMOS 20.

Results: The main results obtained were consistent with the hypotheses. As expected, higher levels of mindfulness led to higher well-being and lower emotional distress through increased self-compassion, and higher levels of dysfunctional attitudes led to lower well-being and higher emotional distress through decreased self-compassion. However, the results also indicated that self-coldness was more important than self-warmth in all of these relationships.

Conclusions: The results of the proposed current study supported the models for the relationships between dysfunctional attitudes, mindfulness, and self-compassion (and its positive and negative components) in predicting the various indicators of emotional distress and well-being of university students. These findings support the use of self-compassion interventions, particularly those aimed at reducing self-coldness, to improve well-being and reduce distress among university students.

Keywords: mindfulness, dysfunctional attitudes, self-compassion, distress, well-being

Introduction

Undergraduate students experience reduced levels of well-being and increased psychological distress compared to the general community (Bore et al., 2016; Larcombe et al., 2016; Regehr et al., 2013); therefore, it is essential to design effective interventions for them to reduce their distress and improve their well-being.

Cognitive vulnerabilities such as dysfunctional attitudes are considered to be well-known mechanisms underlying emotional distress (e.g. negative affect, stress, anxiety, depression, guilt, etc.) and lower levels of well-being (e.g., positive affect, satisfaction with life, etc.). (Abela & D'Alessandro, 2002; Hong & Cheung, 2015; Vișlă et al., 2015; Yapan et al., & Boysan, 2020). On the other hand, mindfulness and self-compassion are protective factors that may reduce distress levels and promote well-being (Carpenter et al., 2019; Chio, et al., 2021; Ferrari et al., 2019; Kirby, et al., 2017; MacBeth & Gumley, 2012; Marsh et al., 2018; Muris & Petrocchi, 2016; Tomlinson et al., 2018; Zessin, et al., 2015).

In general, studies have not consistently shown significant differences in the effectiveness of self-compassion interventions compared to other active approaches such as mindfulness or cognitive restructuring practices (Arimitsu & Hofmann, 2017; Mak et al., 2018; Preuss et al., 2021). However, some findings suggest that self-compassion interventions may be superior in terms of their effectiveness (Javidi et al., 2021) or their acceptability and applicability, particularly for students (Cândeia & Szentágotai-Tătar, 2018), therefore, their adaptation and application in academic settings may be recommended.

Although multiple forms of interventions can be effective, targeting the mentioned constructs, it is advisable to explore the relationships between self-compassion, mindfulness, and various cognitive vulnerabilities (such as dysfunctional attitudes) in predicting various indicators of distress and well-being among university students. This exploration can help identify the most opportune points for intervention from a theoretical perspective. Although many studies have separately examined the relationship between self-compassion and mindfulness, as well as between self-compassion and dysfunctional attitudes, using different models (Ferrari et al., 2018; Li et al., 2022; Liu et al., 2022; Makadi & Koszycki, 2020; Phillips et al., 2018; Podina et al., 2015; Sedighimornani et al., 2019; Wong & Mak, 2013; Xavier et al., 2023), few studies

have simultaneously explored these relationships (i.e., the relationships between cognitive vulnerabilities, mindfulness and self-compassion) in predicting mental health.

In some models examining the relationships between self-compassion, cognitive vulnerabilities and mental health, self-compassion has been proposed as a moderator between cognitive vulnerabilities and distress. There is a growing body of studies on the buffering effects of self-compassion on the relationship between different cognitive vulnerabilities and different indicators of distress and well-being (Ferrari et al., 2018; Fonseca & Canavarro, 2017; Li et al., 2022; Phillips et al., 2018; Podina et al., 2015; Wong & Mak, 2013). The results of these studies are promising, suggesting that self-compassion may reduce the detrimental effects of cognitive vulnerabilities (e.g., maladaptive perfectionism, irrational beliefs, implicit dysfunctional attitudes).

However, other studies (Hassani et al., 2021; Liu et al., 2022; Xavier et al., 2023), found that self-compassion mediated rather than moderated this relationship (i.e., cognitive vulnerabilities such as dysfunctional attitudes led to lower levels of self-compassion, which resulted in higher levels of distress). For example, in a longitudinal study, Liu et al. (2022) found that one of the most common dysfunctional attitudes, negative perfectionism, was a risk factor for depression through the negative component of self-compassion (i.e., self-coldness), and positive perfectionism was a protective factor against depression via the positive component of self-compassion (i.e., self-warmth).

Studies that examine the relationship between mindfulness and self-compassion have shown that self-compassion mediates the relationship between mindfulness and various indicators of distress and well-being, such as social anxiety (Makadi & Koszycki, 2020), shame (Sedighimornani et al., 2019), recovery from mental disorders (Mak et al., 2021), and subjective well-being (Yang et al., 2022). However, Mak et al. (2021) found that only self-warmth mediates the relationship between mindfulness and personal recovery (self-coldness did not).

Thus, it appears that different components of self-compassion (i.e., self-warmth and self-coldness) may play different roles in these associations between dysfunctional attitudes and clinical outcomes and between mindfulness and clinical outcomes (Liu et al., 2022; Mak et al., 2021). The results of meta-analyses (Chio et al., 2021; Muris & Petrocchi, 2016) have also highlighted the importance of separating self-compassionate responses and uncompassionate responses toward the self, the importance of distinguishing self-warmth from self-coldness. Uncompassionate responses

(overidentification, isolation, self-judgment) are more strongly related to distress indicators than compassionate responses, but compassionate responses (mindfulness, common humanity, self-kindness) may be more important for well-being than self-coldness.

The results of mindfulness interventions have also highlighted that they are beneficial not only through increasing mindfulness, but also through increasing self-compassion (i.e., self-compassion is an important mechanism mediating the effects of the interventions) (Baer, 2003; Duarte & Pinto-Gouveia, 2017; Evans, et al., 2018; Keng, et al., 2016). Bergen-Cico and Cheon (2014) investigated the sequence of changes in meditation practices and found that an increase in mindfulness leads to an increase in self-compassion, concluding that in line with Neff's theory of self-compassion (2003b), mindfulness precedes self-compassion, therefore mindfulness skills are important for being able to cultivate self-compassion.

To the best of the author's knowledge, few studies have explored these relationships together (i.e., the relationships between cognitive vulnerabilities, mindfulness, and self-compassion). Thimm (2017), for example, examined the relationship between early maladaptive schemas (another well-established cognitive vulnerability), self-compassion, mindfulness, and psychological distress. Their results showed that self-compassion and mindfulness mediated (but did not moderate) the relationship between early maladaptive schemas and psychological distress, thus both mindfulness and self-compassion were found to be mediators.

Based on previous results, in this study, we propose and test a model (Figure 1) for the relationships between dysfunctional attitudes, mindfulness, and self-compassion in predicting various psychological distress (i.e., negative affect, depression, anxiety, stress) and well-being indicators (i.e., soothing positive affect, activating positive affect, satisfaction with life) among university students. This investigation can help identify the most opportune points for intervention to reduce their distress and improve their well-being.

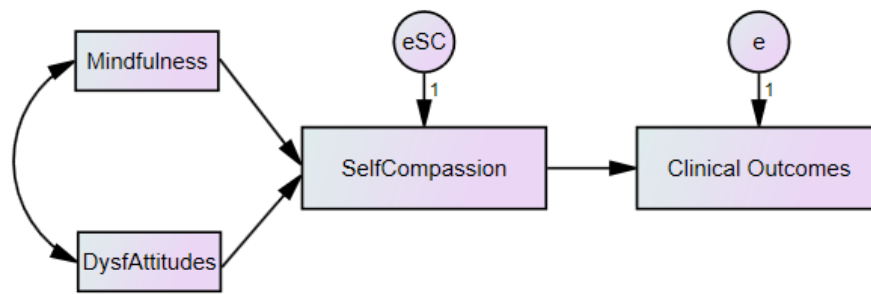


Figure 1. The Proposed Model

We hypothesized that mindfulness and dysfunctional attitudes influence university students' various psychological distress indicators (i.e., negative affect, depression, anxiety, and stress) and various well-being indicators (i.e., soothing positive affect, activating positive affect, and satisfaction with life) through self-compassion. Thus, we considered that mindfulness increases well-being and decreases distress by improving self-compassion, while dysfunctional attitudes lead to higher levels of psychological distress and lower well-being by reducing self-compassion.

Based on the results presented on different components of self-compassion (Chio et al., 2021; Liu et al., 2022; Mak et al., 2021; Muris & Petrocchi, 2016) and based on Gilbert's theory of compassion and emotion regulation systems (2009a, 2009b, 2014), another goal was to investigate which predictor variables (i.e., mindfulness and dysfunctional attitudes) affect clinical variables through which component of self-compassion (i.e., self-warmth or self-coldness). We also tested the second model presented in Figure 2 to achieve this goal.

For the second model, we hypothesized that mindfulness would affect clinical outcomes among students, especially through self-warmth, as well as dysfunctional attitudes, especially through self-coldness. We also hypothesized that in predicting various indicators of distress (i.e., negative affectivity, depression, anxiety, stress), self-coldness would have greater predictive power than self-warmth, while in predicting various indicators of well-being (i.e., soothing positive affect, activating positive affect, satisfaction with life), self-warmth would have greater predictive power than self-coldness.

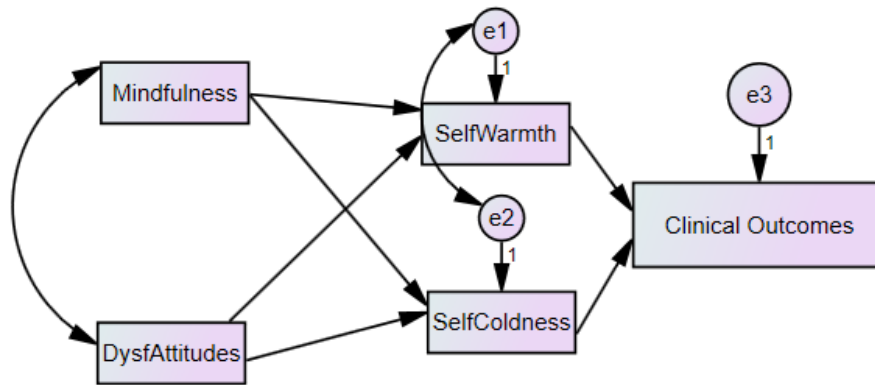


Figure 2. The Proposed Model Accounting for Different Components of Self-Compassion

METHODS

1. Participants

Taking into account that the first model proposed requires the estimation of 10 distinct parameters and the second requires the estimation of 13 distinct parameters, we needed at least 130 participants to test the models (Collier, 2020). In the end, 181 participants (university students) completed the questionnaires and, after preliminary analyses, five participants were excluded. Further analyses were based on the data of the remaining 176 participants. The majority of the participants were female ($n = 140$; 79,5%), from Romania ($n = 130$; 73,9%). Half of the participants studied psychology ($n = 87$; 49,4%), and half studied in other fields of study ($n = 89$; 50,6%). The mean age of the participants was 26,06 years ($SD = 11,17$).

2. Instruments

a) Mindfulness

Mindfulness was assessed using the Five Facet Mindfulness Questionnaire (FFMQ; Baer, et al., 2006), a widely used instrument to measure different components of mindfulness (i.e., observation, description, action with awareness, non-judgment of inner experience, and non-reactivity). This scale consists of 39 items (e.g., „I can perceive emotions without reacting to them”; „I am aware of bodily sensations when I take a bath”), which participants rate on a five-point Likert scale (1 - *never*; 5 - *always true*). For this study, the global mindfulness score (i.e., the mean scores of these subscales) was used.

Higher mindfulness scores indicated higher levels of trait mindfulness. For the global mindfulness indicator, the scale had acceptable internal consistency ($\alpha = .776$).

b) Self-Compassion

Self-compassion was assessed using the Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011), a 12-item version of the original Self-Compassion Scale (SCS; Neff, 2003a). The SCS-SF measures each of the components of self-compassion (i.e., self-kindness, self-judgment, common humanity, isolation, mindfulness, over-identification) with two items (e.g., “I try to see my failings as part of the human condition”). Responses are to be given on a five-point Likert scale. The six items that measure the negative dimensions of self-compassion are reverse coded. Scores for self-compassion were calculated by averaging the scores on items measuring self-compassionate behaviors (i.e., self-kindness, common humanity, mindfulness) and reverse coded scores on items measuring uncompassionate behaviors towards the self (i.e., self-judgment, isolation, over-identification). The scale showed good internal consistency for self-compassion as a global indicator ($\alpha = .822$) and for self-coldness ($\alpha = .816$), but the self-warmth subscale had questionable internal consistency ($\alpha = .628$).

Depression, Anxiety, and Stress

Levels of depression, anxiety, and stress were assessed using the 21-item version of the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995). Participants rated from 0 (*does not apply to me at all*) to 3 (*applies to me very much, or most of the time*) how often they usually experience each symptom. The variable scores were calculated by summing the seven items measuring stress, the seven items measuring depression, and the seven items measuring anxiety. The score for each subscale was then multiplied by 2. Higher scores indicate higher levels of depression, anxiety, and stress.

The DASS-21 showed good internal consistency in the current study for each of the subscales: depression ($\alpha = .860$), anxiety ($\alpha = .836$), and stress ($\alpha = .845$).

c) Negative Affect

To measure the subjective dimension of distress (i.e., negative affect), we used the abbreviated Hungarian version of the Emotional Distress Profile (Profilul Distresului Emoțional - PDE; Opris & Macavei, 2005). The scale was originally developed and validated in Romania and has good psychometric properties and excellent internal consistency ($\alpha = .94$) as a complex indicator of emotional distress.

The original scale consists of 26 adjectives describing negative affects, such as “sad,” and “depressed”. In our study, we used 12 items that had adequate face validity according to the translation. On a five-point Likert scale, participants were asked to rate the extent to which the given affective items were typical of their experiences in the past two weeks. The scale also had excellent internal consistency ($\alpha = .924$) in measuring the negative affect in the present sample.

Soothing and Activating Positive Affects

Different types of positive affect (i.e., soothing and activating positive affects) were assessed using the Types of Positive Affect Scale (Gilbert et al., 2008), which consists of 18 items and measures three different types of positive affect (i.e., soothing-, relaxing-, and activating positive affect), rated by participants between (1 – *Not characteristic of me*) and (5 – *Very characteristic of me*). The scale measures how frequently participants experience these feelings. The variable scores were calculated by summing the dedicated items. For this study, soothing- and activating positive affect were measured. The subscale measuring soothing positive affect showed acceptable ($\alpha = .757$) and the subscale measuring activating positive affect showed good internal consistency ($\alpha = .886$). The results are similar to those of the original English instrument, in that the internal consistency of the activating positive affect subscale was higher ($\alpha = .83$) than that of the subscale measuring safeness/contentment positive affect ($\alpha = .73$).

d) Dysfunctional Attitudes

The Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1980) is a self-report scale designed to measure the presence and intensity of dysfunctional attitudes. The Hungarian version of the DAS (Kopp M., 1994) consists of 35 items (i.e., five items for each of the seven types of dysfunctional attitudes: need for approval, need for love, need for achievement, perfectionism, entitlement, omnipotence, and autonomy), rated on a 5-point Likert scale (-2 = *strongly disagree*; 2 = *strongly agree*). For example, one item for measuring the need for approval is: “I need other people’s approval in order to be happy”. For this study, a global indicator of dysfunctional attitudes was calculated by summing the scores of the individual items. The scale had excellent internal consistency in measuring dysfunctional attitudes ($\alpha = .912$).

e) Life Satisfaction

The five-item Hungarian version of the Satisfaction with Life Scale (SWLS; Diener et al., 1985; Martos et al., 2014) measured the agreement with statements (e.g. “In most

ways my life is close to ideal”), ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Variable scores were calculated by summing the items. The SWLS has shown high internal consistency, test-retest reliability, and validity (Diener et al., 1985). The current study also confirmed good internal consistency ($\alpha = .825$).

3. *Procedure and Design*

This study used a correlational design and measured two predictors (i.e., dysfunctional attitudes and mindfulness), three mediators (self-compassion and separately self-coldness and self-warmth), and seven outcome variables. Of the seven outcome variables, four were used to operationalize emotional distress (i.e., negative affect, depression, anxiety, and stress) and three were used to operationalize psychological well-being (i.e., soothing positive affect, activating positive affect, and satisfaction with life).

The study was conducted in accordance with the Code of Ethics of the American Psychological Association. Following informed consent, students completed the questionnaire using an online platform (Google Forms). The study was advertised in Introduction to Psychology classes. Students were not rewarded for participating in the study.

4. *Data Analyses and Assessment of Model Fit*

SPSS 20 software was used for the preliminary analyses. Pearson correlations were performed to examine the associations between dysfunctional attitudes, mindfulness, self-compassion, and clinical outcomes.

The proposed model was tested using SEM (Structural Equation Modeling) in SPSS AMOS 20 software and Maximum Likelihood (ML) estimation was chosen. We used the bootstrap method to test for direct and indirect effects, generating 5000 samples (95% confidence interval). Effects were considered significant if the confidence intervals of the bootstrap analysis did not include zero (Hayes, 2018; Preacher & Hayes, 2004).

Model fit was assessed using the ratio of the chi-square statistic (CMIN) to the degrees of freedom (DF), standardized root mean square residual (SRMR), comparative fit index (CFI) and general fit index (GFI).

For the chi-square statistic and the degrees of freedom ratio, critical values between 2 and 5 have been recommended as cut-off values (Hu & Bentler, 1999). The CFI

values should not be lower than .90, but for a good fit, the CFI values should be above .95 (Hu & Bentler, 1999). For the GFI, .95 indicates a good fit, while values higher than .90 indicate an acceptable fit. For the SRMR, a value less than .08 is considered acceptable and less than .05 is considered a good fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

RESULTS

1. Preliminary Analyses

The descriptive statistics of the measured variables (means, standard deviations, skewness, kurtosis, and Cronbach's α values) are presented in Table 1.

Table 1. Descriptive Statistics of Variables ($N = 176$)

Variable	M	SD	Skewness		Kurtosis		Cronbach α
			Statistic	Std. Error	Statistic	Std. Error	
Self-Compassion	3.081	.666	.152	.183	-.456	.364	.822
Self-Warmth	3.380	.635	.075	.183	-.253	.364	.628
Self-Coldness	3.216	.874	-.249	.183	-.554	.364	.816
Dysfunctional Attitudes	-11.545	20.584	-.075	.183	-.333	.364	.912
Mindfulness	127.78	19.024	.315	.183	-.527	.364	.776
Negative Affect	29.886	11.216	.435	.183	-.648	.364	.924
Depression	12.318	10.018	.613	.183	-.544	.364	.860
Anxiety	12.875	10.201	.727	.183	.016	.364	.836
Stress	18.454	10.581	.139	.183	-.811	.364	.845
Soothing Positive Affect	14.579	3.206	-.550	.183	.195	.364	.757
Active Positive Affect	28.335	6.923	-.246	.183	-.663	.364	.886
Life Satisfaction	24.676	5.544	-.378	.183	-.357	.364	.825

Data were normally distributed and multivariate normality was tested and confirmed in all cases. First-order correlations between variables are presented in Table 2.

Table 2. Bivariate correlations among predictor and criterion variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Self-Compassion	-											
2. Self-Warmth	.836**											
3. Self-Coldness	-.917**	-.547**										
4. Mindfulness	.532**	.419**	-.506**	-								
5. Dysfunctional Attitudes	-.477**	-.179*	.597**	-.242**	-							
6. Negative Affect	-.546**	-.334**	.589**	-.353**	.404**	-						
7. Depression	-.562**	-.335**	.613**	-.473**	.533**	.597**	-					
8. Anxiety	-.399**	-.228**	.442**	-.316**	.363**	.566**	.590**	-				
9. Stress	-.566**	-.382**	.585**	-.317**	.471**	.680**	.639**	.667**	-			
10. Soothing PA	.446**	.347**	-.428**	.386**	-.211**	-.470**	-.543**	-.296**	-.418**	-		
11. Activating PA	.332**	.286**	-.298**	.336**	-.149*	-.449**	-.390**	-.163*	-.265**	.601**	-	
12. Life Satisfaction	.384**	.305**	-.363**	.336**	-.133	-.363**	-.445**	-.242**	-.291**	.474**	.372**	-

Notes: ** Correlation is significant at the .01 level (2-tailed); * Correlation is significant at the .05 level (2-tailed)

2. Structural Equation Modeling

The First Model – Self-Compassion Mediates the Effects

To analyze the fit of the first model to the data, in which self-compassion was proposed as a mediator of the relationships between mindfulness and clinical outcomes, as well as between dysfunctional attitudes and clinical outcomes, a series of (seven) structural equation modeling tests were conducted for different clinical outcomes (four for emotional distress and three for well-being). In all cases, we found that self-compassion was a significant mediator (i.e., the indirect effects of mindfulness and dysfunctional attitudes were significant in all cases). Consistent with our hypotheses, mindfulness, and dysfunctional attitudes affected all psychological distress indicators (i.e., negative affect, depression, anxiety, and stress) and all well-being indicators (i.e., soothing positive affect, activating positive affect, and satisfaction with life) through self-compassion. In other words, higher levels of mindfulness led to improved well-being and reduced distress through improvements in self-compassion, and higher levels of dysfunctional attitudes led to higher levels of psychological distress and lower levels of well-being through reductions in self-compassion. Figure 3 shows the first model for negative affect with standardized regression weights.

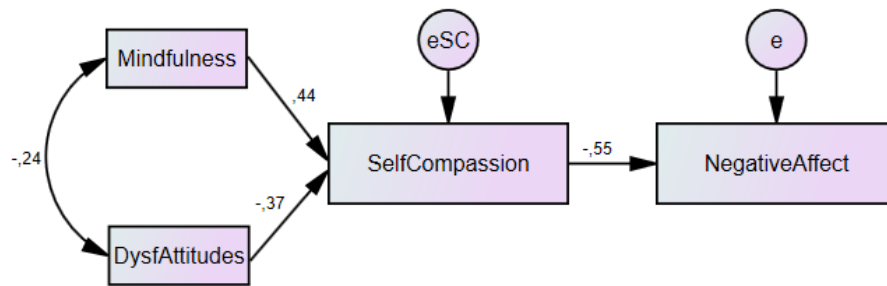


Figure. 3 Predicting negative affect mediated by self-compassion

All predictors were significant and the correlation between mindfulness and dysfunctional attitudes was also significant ($r = -.242$; $95\%CI = -.385$ to $-.100$; $p < .01$). Both mindfulness ($\beta = .44$, $p < .01$) and dysfunctional attitudes ($\beta = -.37$, $p < .01$) predicted self-compassion (see Table 3). Self-compassion had a direct effect on all clinical outcomes (Table 2). Self-compassion was a negative predictor of distress indicators: negative affect ($\beta = -.546$, $p < .01$), depression ($\beta = -.562$, $p < .01$), anxiety ($\beta = -.399$, $p < .01$), and stress ($\beta = -.566$, $p < .01$); and was a positive predictor of well-being: soothing positive affect ($\beta = .446$, $p < .01$), activating positive affect ($\beta = .332$, $p < .01$), and satisfaction with life ($\beta = .384$, $p < .01$). Indirect effects for mindfulness and dysfunctional attitudes were also significant in all cases.

Table 3. Standardized direct and indirect effects for the first model

Predictor	Effect type	Outcome	Standardized Effects	95% CI	
				LL	UL
Mindfulness	Direct	Self-compassion	.442**	.296	.574
Dysfunctional Attitudes	Direct	Self-compassion	-.370**	-.485	-.248
Self-compassion	Direct	Negative affect	-.546**	-.649	-.427
Self-compassion	Direct	Depression	-.562**	-.655	-.460
Self-compassion	Direct	Anxiety	-.399**	-.526	-.259
Self-compassion	Direct	Stress	-.566**	-.664	-.453
Self-compassion	Direct	Soothing Positive Affect	.446**	.321	.562
Self-compassion	Direct	Activating Positive Affect	.332**	.206	.455
Self-compassion	Direct	Satisfaction With Life	.384**	.243	.514
Mindfulness	Indirect	Negative affect	-.241**	-.331	-.153
Mindfulness	Indirect	Depression	-.248**	-.339	-.159
Mindfulness	Indirect	Anxiety	-.176**	-.263	-.097
Mindfulness	Indirect	Stress	-.250**	-.341	-.163
Mindfulness	Indirect	Soothing Positive Affect	.197**	.114	.289
Mindfulness	Indirect	Activating Positive Affect	.147**	.074	.235
Mindfulness	Indirect	Satisfaction With Life	.169**	.086	.262
Dysfunctional Attitudes	Indirect	Negative affect	.202**	.122	.291
Dysfunctional Attitudes	Indirect	Depression	.208**	.126	.294
Dysfunctional Attitudes	Indirect	Anxiety	.147**	.080	.229
Dysfunctional Attitudes	Indirect	Stress	.209**	.127	.298
Dysfunctional Attitudes	Indirect	Soothing Positive Affect	-.165**	-.237	-.100
Dysfunctional Attitudes	Indirect	Activating Positive Affect	-.123**	-.179	-.071
Dysfunctional Attitudes	Indirect	Satisfaction With Life	-.142**	-.209	-.080

Notes: ** The regression is significant at the .01 level; CI Confidence Interval; LL Lower Limit; UL Upper Limit

We also examined the model fit of the first model for all clinical outcomes (Table 4). The fit indices (GFI and CFI) indicated a good model fit for most outcomes, and the standardized root mean square residual (SRMR) also indicated a low error rate. However, for depression, CFI and SRMR were outside the acceptable range.

Table 4. The model fit of the proposed model for different clinical outcomes

Clinical Outcome	CMIN	DF	CMIN/DF	GFI	CFI	SRMR
Negative Affect	8.33	2	4.16	.977	.962	.049
Depression	38.44	2	19.22	.910	.820	.100
Anxiety	11.71	2	5.85	.969	.930	.063
Stress	14.13	2	7.06	.963	.932	.063
Soothing Positive Affect	6.87	2	3.43	.981	.966	.047
Active Positive Affect	7.12	2	3.56	.980	.959	.050
Life Satisfaction	5.707	2	2.85	.984	.972	.044

The Second Model – Self-Coldness Mediates the Effects

To analyze the fit of the second model to the data, in which self-coldness and self-warmth were separately proposed as mediators of the relationships between mindfulness and clinical outcomes, and between dysfunctional attitudes and clinical outcomes, we also performed a series of structural equation modelings for different clinical outcomes. The indirect effects of mindfulness and dysfunctional attitudes were significant in all cases (Table 5).

Table 5. Standardized indirect effects for the second model

Predictor	Effect type	Outcome	Standardized Effects	95% CI	
				LL	UL
Mindfulness	Indirect	Negative affect	-.229**	-.318	-.141
Mindfulness	Indirect	Depression	-.235**	-.328	-.147
Mindfulness	Indirect	Anxiety	-.166**	-.251	-.086
Mindfulness	Indirect	Stress	-.241**	-.331	-.153
Mindfulness	Indirect	Soothing Positive Affect	.195**	.113	.287
Mindfulness	Indirect	Activating Positive Affect	.148**	.074	.237
Mindfulness	Indirect	Satisfaction With Life	.168**	.086	.263
Dysfunctional Attitudes	Indirect	Negative affect	.293**	.209	.382
Dysfunctional Attitudes	Indirect	Depression	.309**	.232	.390
Dysfunctional Attitudes	Indirect	Anxiety	.227**	.146	.314
Dysfunctional Attitudes	Indirect	Stress	.278**	.190	.374
Dysfunctional Attitudes	Indirect	Soothing Positive Affect	-.185**	-.267	-.098
Dysfunctional Attitudes	Indirect	Activating Positive Affect	-.116**	-.193	-.036
Dysfunctional Attitudes	Indirect	Satisfaction With Life	-.153**	-.233	-.071

Notes: ** The regression is significant at the .01 level; CI Confidence Interval; LL Lower Limit; UL Upper Limit

Consistent with our hypothesis, dysfunctional attitudes had a direct effect only on self-coldness ($\beta = .504, p < .01$), but not on self-warmth ($\beta = -.082, p > .05$). However, contrary to our hypothesis, mindfulness was a significant predictor for both, a positive predictor of self-warmth ($\beta = .399, p < .01$), and a negative predictor of self-coldness ($\beta = -.383, p < .01$). The direct effects of mindfulness and dysfunctional attitudes on self-warmth and on self-coldness are shown in Figure 4 and Table 6.

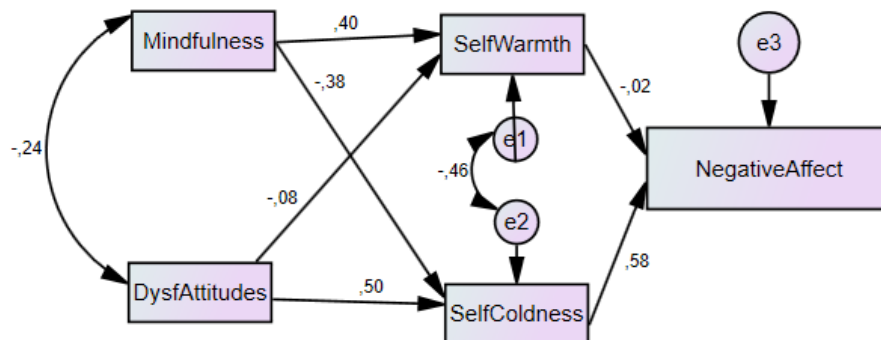


Figure 4. Predicting negative affect through self-warmth and self-coldness

The covariance and the correlation between errors for self-warmth and self-coldness were also significant ($r = -.460$; 95%CI = $-.565$ to $-.343$; $p < .01$). The model is presented in Figure 4 for negative affect.

Table 6. Standardized direct effects for the second model

Predictor	Effect type	Outcome	Standardized Effects	95% CI	
				LL	UL
Mindfulness	Direct	Self-Warmth	.399**	.232	.546
Mindfulness	Direct	Self-Coldness	-.383**	-.497	-.257
Dysfunctional Attitudes	Direct	Self-Warmth	-.082	-.233	.066
Dysfunctional Attitudes	Direct	Self-Coldness	.504**	.397	.600
Self-warmth	Direct	Negative affect	-.018	-.179	.139
Self-warmth	Direct	Depression	.000	-.146	.148
Self-warmth	Direct	Anxiety	.020	-.127	.173
Self-warmth	Direct	Stress	-.089	-.232	.060
Self-warmth	Direct	Soothing Positive Affect	.161*	-.017	.340
Self-warmth	Direct	Activating Positive Affect	.176*	.001	.350
Self-warmth	Direct	Satisfaction With Life	.152	-.015	.319
Self-coldness	Direct	Negative affect	.579**	.449	.699
Self-coldness	Direct	Depression	.612**	.508	.718
Self-coldness	Direct	Anxiety	.452**	.312	.583
Self-coldness	Direct	Stress	.537**	.410	.661
Self-coldness	Direct	Soothing Positive Affect	-.340**	-.487	-.176
Self-coldness	Direct	Activating Positive Affect	-.202**	-.367	-.032
Self-coldness	Direct	Satisfaction With Life	-.280**	-.434	-.114

Notes: ** The regression is significant at the .01 level; * The regression is significant at the .05 level; CI Confidence Interval; LL Lower Limit; UL Upper Limit

Testing the effects of self-warmth and self-coldness separately on the different outcomes, the results showed that self-coldness was more relevant in all cases (not only for indicators of emotional distress). The direct effects of self-warmth on the different indicators of well-being and distress are presented in Table 6. Self-warmth had no significant effect on the distress indicators: neither negative affect ($\beta = -.018, p > .05$), nor depression ($\beta = .000, p > .05$), nor anxiety ($\beta = .020, p > .05$), nor stress ($\beta = -.089, p > .05$). We found a small effect of self-warmth on soothing positive affect ($\beta = .161, p < .05$) and activating positive affect ($\beta = .176, p < .05$), but based on the bootstrapping method the effect on soothing positive affect was not significant. Self-warmth also did not affect satisfaction with life ($\beta = .152, p > .05$).

Although self-warmth did not affect clinical outcomes, self-coldness was a significant positive predictor (see Table 6) for all distress indicators: negative affect ($\beta = .579, p < .01$), depression ($\beta = .612, p < .01$), anxiety ($\beta = .452, p < .01$), and stress ($\beta = .537, p < .01$); and was a negative predictor for all well-being indicators: soothing positive affect ($\beta = -.340, p < .01$), activating positive affect ($\beta = -.202, p < .01$), and satisfaction with life ($\beta = -.280, p < .01$). Thus, our last hypothesis was partially confirmed, our data supported that self-coldness was more relevant than self-warmth in predicting various indicators of distress, but contrary to our hypothesis, self-coldness also had greater predictive power than self-warmth for various indicators of well-being.

Assessing the model fit of the second model for all clinical outcomes (Table 7), we found that the fit indicators (GFI and CFI) indicated a good fit to the model for all outcomes (including depression), and the standardized root mean square residual (SRMR) also indicated a low level of error.

Table 7. The model fit of the second model with different components of self-compassion for different clinical outcomes

Clinical Outcome	CMIN	DF	CMIN/DF	GFI	CFI	SRMR
Negative Affect	2.51	2	1.256	.994	.998	.019
Depression	26.10	2	13.05	.947	.921	.060
Anxiety	6.44	2	3.22	.986	.982	.035
Stress	8.20	2	4.10	.982	.978	.034
Soothing Positive Affect	6.79	2	3.39	.985	.980	.038
Active Positive Affect	7.21	2	3.60	.984	.977	.041
Life Satisfaction	6.07	2	3.03	.987	.982	.037

DISCUSSION

The present study aimed to test the fit of two proposed models of the relationship between dysfunctional attitudes, mindfulness, self-compassion (its two components), and various indicators of university students' distress and well-being. In the first model, the mediative role of self-compassion was tested for the relationship between mindfulness and various clinical outcomes (i.e., various indicators of emotional distress: negative affect, depression, stress, and anxiety; and various indicators of well-being: soothing positive affect, activating positive affect, and life satisfaction), and for the

relationship between dysfunctional attitudes and these clinical outcomes. In the second model, we separately examined the mediation role of self-warmth (i.e., mean scores for the positive components of self-compassion: mindfulness, common humanity, and self-kindness) and self-coldness (i.e., mean scores for the negative components of self-compassion: over-identification, isolation, and self-judgment) in these relationships.

Reinforcing previous results (Hassani et al., 2021; Mak et al., 2021; Makadi & Koszycki, 2020; Liu et al., 2022; Sedighimornani et al., 2019; Xavier et al., 2023; Yang et al., 2022), our hypotheses for the first model were confirmed, which means that mindfulness led to an increase in students' well-being and a decrease in their emotional distress through self-compassion, and dysfunctional attitudes led to a decrease in well-being and an increase in emotional distress through self-compassion. In most cases, the first model provided an excellent fit to the data, with depression being an exception. When we investigated which of the relationships not represented in the model might increase the model fit, we found that dysfunctional attitudes not only lead to depression through self-compassion but also directly affect it. This is not surprising given that the Dysfunctional Attitudes Scale (Weissman & Beck, 1978) was developed specifically to measure dysfunctional attitudes in depression.

Based on Gilbert's theory (2009a, 2009b, 2014) and findings on the relative importance of self-coldness and self-warmth in predicting indicators of distress and well-being (Chio et al., 2021; Liu et al., 2022; Mak et al., 2021; Muris & Petrocchi, 2016), in the second model we tested the mediative role of these two components of self-compassion (i.e., self-coldness and self-warmth) separately. This model showed a good fit for the data for all clinical outcomes (including depression).

Our hypothesis that dysfunctional attitudes would influence clinical outcomes, especially through self-coldness, based on the results of Liu et al. (2022), was confirmed. We found a direct effect of dysfunctional attitudes only on self-coldness (not on self-warmth) and significant indirect effects on all outcomes. This implies that dysfunctional attitudes lead to a decrease in students' well-being and an increase in their emotional distress through self-coldness.

Our unexpected findings that mindfulness had an indirect effect on clinical outcomes (including well-being indicators), in many cases only through self-coldness, can be explained by the fact that self-warmth has no direct effect on these clinical indicators (mindfulness had a direct effect on both self-warmth and self-coldness). The exception

was activating positive affect, which means that, for activating positive affectivity, the influence of mindfulness was mediated by both components of self-compassion, however, for the other six outcomes (including distress indicators and other well-being indicators), only self-coldness mediated the effect of mindfulness. Indeed, in the findings of Mak et al. (2021), only self-warmth mediated the relationship between mindfulness and personal recovery from mental problems, but mindfulness had a direct effect on both self-coldness and self-warmth, as in our study.

Based on the results of meta-analyses (Chio et al., 2021; Muris & Petrocchi, 2016), we expected that self-coldness would have greater predictive power than self-warmth in predicting various indicators of distress (i.e., negative affectivity, depression, anxiety, stress), and that self-warmth would have greater predictive power than self-coldness in predicting various indicators of well-being (i.e., soothing positive affect, activating positive affect, satisfaction with life). However, our results showed that when we control for covariance between the two components when testing the relations in a single model, self-coldness also has greater significance in indicators of well-being. If we were to base our conclusions only on the correlation test (Table 1), we would draw completely different conclusions. Although in our model, self-warmth did not affect any of the distress indicators (i.e., negative affect, depression, anxiety, stress), the correlations between them were significant in all cases. Furthermore, based on correlation analyses alone, the relationships between self-warmth and well-being indicators were similar to the relationships between self-coldness and well-being indicators.

This makes sense given the results of the current meta-analysis (Chio et al., 2021), which found that although self-kindness ($r = .39$) was more strongly associated with well-being than self-judgment ($r = -.29$), and mindfulness ($r = .39$) was more strongly associated with well-being than over-identification ($r = -.32$), common humanity ($r = .29$) had a significantly weaker relationship with well-being (both eudaimonic and hedonic well-being) than isolation ($r = -.36$). The effect size of the relationship between self-warmth and the well-being ($r = .38$) and effect size of the relationship between self-coldness ($r = -.36$) and well-being were significantly different, but the difference was small. Based on these results, we conclude that it is very important to examine the relative importance of self-coldness and self-warmth in models in which the individual effects of each component can be tested while controlling for the effects of the other.

Overall, these results highlight the importance of self-compassion (especially self-coldness) regarding students' mental health. Based on these findings, the implementation of self-compassion interventions in academic context would be a major step towards supporting students' well-being and reducing their distress, however, randomized controlled trials are needed to test the effectiveness of these interventions. The most well-established programs designed to cultivate self-compassion include the Mindful Self-Compassion Program (MSC), developed and tested by Neff and Germer (2012) based on Neff's (2003a, 2003b, 2023a, 2023b) conceptualization of self-compassion, and the Compassionate Mind Training (CMT; Irons & Heriot-Maitland, 2021), based on Gilbert's (2009a, 2009b, 2009c, 2023) biopsychosocial and evolutionary approach to self-compassion, the Compassion Focused Therapy (CFT) model. Both are group-based resource-building training programs spanning eight weeks, and both incorporate a blend of written exercises, imaginative practices, meditation, and body-based activities. There is increasing evidence to support the effectiveness of these programs (e.g., Germer & Neff, 2019; Irons & Heriot-Maitland, 2021; Matos et al., 2017; Neff & Germer, 2012), even for university students (e.g., Beaumont et al., 2021; Smeets et al., 2014).

Although generally, studies have not revealed significant differences in the effectiveness of self-compassion interventions when compared with alternative approaches, such as cognitive restructuring (see, e.g., Arimitsu & Hofmann, 2017), some findings indicate the potential superiority of self-compassion interventions, based on their effectiveness (Javidi et al., 2021), or their acceptability and applicability for students (Cândeia & Szentágotai-Tătar, 2018). Therefore, the adaptation of these interventions is highly recommended.

Despite the significance of these results, our study has some limitations. Firstly, although these models have good to excellent fit to the data, the model fit may be overestimated due to low degrees of freedom ($df = 2$; Collier, 2020). Secondly, our model could be further elaborated by taking into account six different components of self-compassion (i.e., mindfulness, common humanity, self-kindness, over-identification, isolation, self-judgment), instead of only addressing the negative (self-coldness) and the positive (self-warmth) components. Further research has been proposed which focuses on these specific components, especially based on the results cited by Chio et al. (2021). Considering the psychometric properties of the six subscales, the original Self-

Compassion Scale (Neff, 2003a) is recommended for this purpose due to the low internal consistency of the scale's abbreviated form (Raes et al., 2011).

For further research, it is recommended to consider the different facets of mindfulness (i.e., observation, description, acting with awareness, non-judgment of inner experience, and non-reactivity) and the different types of dysfunctional attitudes in these relationships (i.e., need for approval, need for love, need for achievement, perfectionism, entitlement, omnipotence, and autonomy). The findings of previous studies suggest that different aspects of mindfulness may have different degrees of influence on student distress and well-being (Bodenlos et al., 2015), and that mindfulness interventions may improve these with varying levels of effectiveness (Quaglia et al. & Brown, 2016). Thus, it may be important to consider these separately in these models.

The correlational design also restricts our understanding of these relationships. Without a longitudinal perspective, potentially reversed pathways or alternative explanations remain unaddressed. Therefore, it is recommended to further investigate self-compassion as a mediator in these relationships in a longitudinal design, in particular, based on the results of Maxwell et al. (2011), which show that cross-sectional analyses can indicate the existence of a significant indirect effect, even when the true longitudinal indirect effect is zero. Randomized controlled trials are also recommended to test the effectiveness of the most well-established programs designed to cultivate self-compassion for improving students' mental health.

CONCLUSION

The current study contributes to a growing body of literature that emphasises the importance of self-compassion in improving student well-being and reducing emotional distress. Our findings show that self-compassion is an important mechanism through which dysfunctional attitudes and low levels of mindfulness lead to emotional distress and lower levels of well-being among university students, and also highlight the importance of self-coldness (as opposed to self-warmth) in these relationships. Results for several clinical indicators (four distress indicators: negative affect, depression, anxiety, stress; and three well-being indicators: soothing positive affect, activating positive affect, and life satisfaction) were consistent with our models, which confirms the reliability of the tested models. These findings support the use of self-compassion interventions, in particular the importance of reducing self-coldness, to improve well-being and reduce emotional distress among university students. These interventions can be essential taking into account that college students experience elevated psychological distress and lower levels of well-being compared to the general community (Bore et al., 2016; Larcombe et al., 2016; Regehr et al., 2013; Tobar et al., 2022).

Overall, this study has implications for university education policies, since the introduction of self-compassion interventions, such as the Compassionate Mind Training or the Mindful Self-Compassion Program, would be a major step towards supporting students' mental health, reducing their distress and enhancing their well-being.

Both the Mindful Self-Compassion Program (MSC; Germer & Neff, 2019; Neff & Germer, 2012) and the Compassionate Mind Training (CMT; Irons & Heriot-Maitland, 2021) are group-based eight-week resource-building trainings. The Compassionate Mind Training was adapted to academic settings by the first author of this article and its effectiveness has been tested among psychology students. Preliminary results support its effectiveness on various indices of distress and well-being (results in press). In addition, qualitative (narrative) feedback reflects the feasibility, effectiveness, and perceived need for the program in academic settings. In this case, the program was part of the students' profile practice, however, its application may vary (for example, it may be delivered in counselling centers or as a facultative module). In a recent systematic review, Franzoi et al. (2022) overviewed the current psychological services offered to students in Europe,

but none of the studies identified examined self-compassion interventions, therefore, the introduction and investigation of these types of interventions is highly recommended during tertiary education.

The results of this study also highlight the importance of examining the effects of self-coldness and self-warmth on emotional distress and well-being in complex models using structural equation modeling (not just correlations) in which the individual effects of each component can be tested while controlling for the effect of the other.

Compliance with Ethical Standards

- a) *Conflict of Interest* - No conflict of interest is associated with this publication.
- b) *Ethical Standards* - The study was undertaken in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.
- c) *Informed Consent* - All participants gave their informed consent prior to their inclusion in the study.
- d) *Funding* - No funding was received to assist with the preparation of this manuscript.

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Game Experience of Primary and Preschool Pedagogy Students in a Gamified Mathematics Class

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Abstract: The paper presents a quasi-experimental study using gamification in Seppo during a mathematics course for primary and preschool pedagogy students. The aim of the investigation was to examine students' game experience and their motivation during the game. The research tools were the Gameful Experience Scale [GAMEX] and the Game Experience Questionnaire (developed by the authors). The participants were 32 second-year students. The results show that students' enjoyment and the feeling of creativity was high, but their activation, absorption in the game and feeling of dominance were low. Students' self-reports show that they liked the game's story, the teamwork, and the diverse nature of the assigned tasks. The perceived stress during the game was also relatively low. There was a strong negative correlation between enjoyment and perceived stress. The elements that contributed most to perceived stress were the difficulty of the tasks, the lack of time, and the competition between teams. The motivating elements mentioned frequently by the students were teamwork, collecting game money, and reaching higher levels of the game. A prevailing pattern among the students involved being influenced by both internal and external motivation throughout the course of the game. For one-third of the students, motivation increased at the beginning and decreased at the end of the game, while nearly another third's motivation increased at the end of the game. Students preferred the

version of the game with physical movement in the building and enjoyed the freedom of selecting the difficulty of the tasks when the game did not restrict the advancement to a higher level.

Keywords: gamification, game experience, motivation, teaching mathematics, primary and preschool pedagogy students, pre-service teachers

Introduction

Developing problem-solving skills is one of the most important goals of teaching mathematics (Liljedahl, 2016). This competency should be developed starting with the early years (Varol & Farran, 2006). Thus, the primary school period is crucial to cultivate pupils' problem-solving skills, and in this process, the primary school teacher has a decisive role. Teachers should have adequate problem-solving competency to be able to develop their pupils' skills. If the teachers' problem-solving skills are not on a higher level, and for this reason, they usually only address routine problems in the classroom, pupils also remain on this routine level of problem-solving (Näveri et al., 2011). A significant percentage of primary school pedagogy students do not possess adequate mathematical problem-solving skills (Marchiş, 2013b); therefore, it is essential to improve their competencies. Mathematical problem-solving competence can be developed only by solving non-routine problems and by spending a significant amount of time on mathematical problems (Leppäaho, 2018). Solving non-routine problems can be demanding and practicing repeatedly can become boring. Problem-solving competence is in correlation with the attitude towards mathematics, especially with the feelings towards this subject (Marchiş, 2013a). The majority of preservice primary school teachers don't like mathematics (Marchiş, 2013a). Thus, preservice teachers' attitude towards mathematics should be changed into a more positive one and they should be motivated to solve problems. It is important to use teaching methods that increase and maintain students' motivation to solve mathematical problems, and gamification can be an adequate tool for this.

Gamification is "the use of game design elements in non-game contexts" (Deterding et al., 2011, p. 10). In the case of education, gamification can play the role of turning the learning process from a serious activity into a game (Rauschenberger et al., 2019). Gamification is used in higher education mostly for blended learning courses (Dicheva et al., 2015; Dichev & Dicheva, 2017), most often in computer science related subjects, as shown also in the reviews made by Dicheva et al. (2015), Ortiz et al. (2016), and Dichev and Dicheva (2017). There are not many studies regarding the application of gamification in teaching mathematics at university level (some examples: Faghihi et al., 2014; Cadavid & Gómez, 2015; Molnar, 2019; Lanuza, 2020; Zsoldos-Marchiş, 2020; Zsoldos-Marchiş & Opriş, 2021; Egri et al., 2022; Opriş et al., 2023). However, the number

of these studies is increasing, as in the review by Dicheva et al. (2015) there was only one mathematics related gamification mentioned out of the 34 included in the study, while in the review by Dichev and Dicheva (2017) there are already five mathematics-related papers included out of 51.

In this research, gamification is used during a university level mathematics course for motivating students and for turning the problem-solving activities into an enjoyable game-like experience. The aim of the research is to experiment with a 10-week-long gamification designed in Seppo (<https://seppo.io>) to solve mathematical problems. The study tries to find answers to research questions related to game experience and motivation, such as how different gamification elements contribute to the motivation of the students or how students' motivation changes during the gamified problem-solving. In a previous experiment (Opriş et al., 2023) with gamified problem sheets designed in Seppo, students played individually. The results show no change in intrinsic motivation, as students were intrinsically motivated by the satisfaction of a successful solution. Students' extrinsic motivation increased, the most motivating gamification elements being points and the leaderboard. Students reported a decrease in motivation by the end of the semester due to many other activities and assignment deadlines. The present research experiments with a gamification in which students work in teams and are physically present in a classroom.

1. Gameplay experience and motivation

The gamification of education is an “approach for increasing learners' motivation and engagement by incorporating game design elements in educational environments” (Dichev & Dicheva, 2017, p. 1). Some of the most important gamification design principles are goal setting, customised learning environment, fast feedback, progress, freedom of choice and storytelling (Dicheva, et al., 2015). These principles can be applied by adding some gamification elements to the course, such as points, levels, stories, unlocked content, etc. (Nah et al., 2014).

Gameplay experience can be defined as “an ensemble made up of the player's sensations, thoughts, feelings, actions and meaning-making in a gameplay setting” (Ermi & Mäyrä, 2005, p. 91). But the term game experience can be used in a nongame setting as well, where it “refers to the positive emotional and involving qualities of using a gamified application” (Eppmann et al., 2018, p. 100). The game experience is multidimensional

(Elson et al., 2014). Eppmann et al. (2018) establish six dimensions in their game experience scale: enjoyment, absorption, creative thinking, activation, absence of negative affect, and dominance. In the scale developed by Högberg et al. (2019) there are seven dimensions: accomplishment, challenge, competition, guided immersion, playfulness and social experience. The dimensions are not precisely determined, there are differences among various studies.

In the following, some of the dimensions mentioned above are discussed. Immersion in the game is realized when the player loses awareness of time and their real environment (Jennett et al., 2008), a cognitive state in which the player feels “in the game” (Cairns et al., 2014). It is a state close to flow, but not the same (Högberg et al., 2019), because flow is seen as a positive state, but immersion can also have negative aspects, such as anxiety (Jennett et al., 2008). Absorption also appears in some studies, yet it is not the same as immersion. Absorption is “directing attention to an experience”, while immersion is becoming part of that experience (Ermi & Mäyrä, 2005, p. 94). When comparing the elements of the immersion dimension from the GAMEFULQUEST scale (Högberg et al., 2019) with the elements of the absorption dimension of the GAMEX scale (Eppmann et al., 2018), the absorption dimension on the GAMEX scale can be considered immersion.

Motivation is one of the criteria for evaluating gamification. While a meta-analysis by Sailer and Homner (2020) shows that there is a significant but small effect of gamification on motivation, yet there is a considerable level of heterogeneity among different studies. In another meta-analysis study, Zhang and Yu (2022) show that gamification has a positive effect on motivation, both intrinsic and extrinsic. Gamification has a more stable effect on intrinsic motivation than on the extrinsic one, as in the case of extrinsic motivation the heterogeneity is significant, despite the effect size being higher. The higher stability of intrinsic motivation in comparison to extrinsic motivation can be explained by the fact that gamification can increase intrinsic motivation by internalizing high extrinsic motivation (Vansteenkiste et al., 2006). Even if meta-analysis studies show a positive effect of gamification on motivation, not all experiments lead to the conclusion that gamification increases motivation (Dicheva et al., 2015; Dichev & Dicheva, 2017). Another question, which should be addressed when studying the effect of gamification on motivation, is related to the influence of different game elements used. A difficulty in this study is that usually during gamification various game elements are

used in combination, therefore the effect of each element cannot be precisely identified (Hamari et al., 2014). Studies in which the effect of different elements of the game on motivation was measured based on the responses of the participants report different effects on the same element (Leitão et al., 2022).

Methodology

Quasi-experimental research was carried out during the second semester of the 2022-2023 academic year at Babeş-Bolyai University, Romania. Gamification was used during a mathematics course for second year primary and preschool pedagogy students.

1. Research questions

This research tries to find the answers to the following questions:

1. What was the students' game experience during the Seppo game?
2. What do students like about gamified mathematics problem solving using Seppo?
3. What is students' stress level during the Seppo game and what are the factors responsible for the perceived stress?
4. How did students' motivation change during the Seppo game?
5. Which gamification elements motivated students to problem-solve?
6. What are the correlations between students' game experience, perceived stress level, and motivation?

2. Participants

32 primary and preschool pedagogy students have participated in the research. They were in their second year of study. The age of the participants was between 19 and 24, with an average of 20,65 and mode 20. Only one participant was male, the other participants were all female. 56.25% of the participants were from rural areas.

3. Description of the game in Seppo

In this experiment a game with mathematical tasks combined with travel organization tasks was developed by the researchers and played by the participants. The game was designed on the Seppo platform. The story created to frame the game was the following: The world of fairy tales is in great trouble, because streaming platforms have

kidnapped the characters of fairy tales and hidden them so that children would no longer read fairy tales but watch cartoons and movies. Since students are aware of the role of fairy tales in personality development, they know that fairy tale characters must be freed. In addition to these, the weed multicompanies also burnt all the fairy tale books, so players should also collect money to republish these. Fortunately, two invented companies (Grimm & Andersen Kft., together with Népmese Zrt.) support them in this task with a substantial amount. Of course, as in all fairy tales, nothing falls into their laps, they have to work for everything, but with a little cunning and ingenuity, they easily obtain the amount needed to search for the characters of the fairy tale and to publish the books.

The game had 10 stages. Each stage was played in a 2-hour seminar. In the first stage students had to get the seed money they used in order to start their adventure. The tasks were hidden in the building where the course was organized and they had to find them using the online map (Figure 1) and solve them to get money. The more tasks they successfully solved, the more starting capital they could earn. The next stages were played in the classroom on virtual maps in Seppo (Figure 2, A & B). Each stop had a short story that tied into the frame story. These contained a description of where they should travel, where they would find the next writer and his fairy tale characters, and what means of transport they could use to get there. They had to organize the trips using real travel information from the internet. The hiding places of the characters were marked on the maps, where different tasks had to be done to free them. The text of each task was formulated to be part of the story. All stages were organized into levels. There were stages where the players could freely choose to move between levels, but there were also stages where the advancement to a higher level was conditioned by the completion of certain tasks on the previous level. The last stage was also played in the building, using the map of the building as a gameboard in Seppo (Figure 1).

The game was played in teams. Each team had its own spreadsheet in which they kept track of their incomes and expenses. The amount left at the end of the mission was spent on book publishing. Throughout the whole game teams had to move together, they were not allowed to split up.

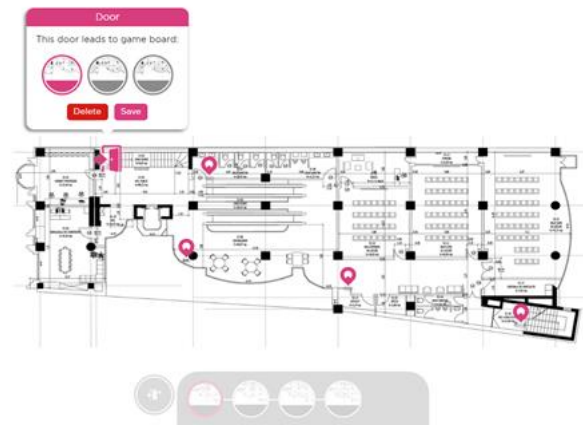


Figure 1. Board (map) of the game in the building

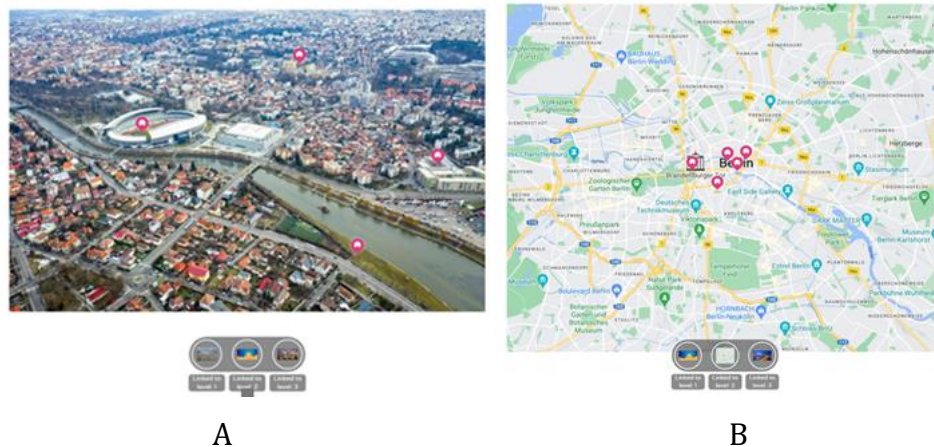


Figure 2. Boards (maps) of the games

4. Instruments

As a first step, students were asked to provide some demographic data (e.g., age, gender, etc.), after which they completed two questionnaires measuring game experience. The instruments were filled in by the participants after the intervention.

The **Gameful Experience Scale [GAMEX]** developed by Eppmann et al. (2018) was translated into Hungarian by the authors. This scale contains 26 items grouped into six factors: *enjoyment* (e.g., Playing the game was fun.), *absorption* (e.g., Playing the game made me forget where I am.), *creative thinking* (e.g., Playing the game sparked my imagination.), *active participation/activation* (e.g., While playing the game I felt motivated to participate actively.), *absence of negative affect* (e.g., While playing the game I felt upset.), and *dominance* (e.g., While playing the game I felt influential.). Participants had to rate their level of agreement regarding each item on a 5-point Likert scale.

A **Game Experience Questionnaire** (GEQ) was developed to evaluate the experience of students during the game used in the current experiment. It contains 17 items, from which 13 are closed (scale, multiple choice, and checkboxes) and 4 are open-ended. The questions refer to the satisfaction offered by the game, the elements and mechanisms of the game that the students enjoyed the most (e.g.: “What did you like in the game?”), the type of motivation during the game and its changes (e.g.: “How did your motivation change during the game?” with the options: increased by the end of the game/ increased at the beginning of the game and decreased at the end of the game/ decreased at the end of the game/ decreased at the beginning of the game and increased at the end of the game/ didn’t change during the game), the elements which assured the maintenance of motivation and the perceived stress level (e.g.: “On a scale from 1 to 5 evaluate the stress you felt during the game.”).

5. *Data collection and analysis*

Students completed these two instruments online in June 2023 at the end of the 10-week long game. The data obtained were quantitatively (closed questions) and qualitatively (open-ended question) analyzed. For quantitative analysis, frequencies, percentages, means, and standard deviations were calculated. For comparisons, the Wilcoxon signed-rank test and the ANOVA test were used. Pearson’s correlation coefficients between the subscales of the GAMEX scale were calculated. For qualitative analysis, the MAXQDA program was used. To analyze the answers given to the open-ended questions, codes and subcodes were identified, and frequencies for these codes and subcodes were calculated.

In the case of the GAMEX scale, the *absence of negative affect* subscale items had to be reverse scored, as suggested by the scale. In the data analysis instead of reverse scoring the scores the subscale name was changed to *negative affect*.

Results and discussion

1. *Game experience measured with the GAMEX scale*

The mean (M) and standard deviation (SD) were calculated for each of the factors on the GAMEX scale (Table 1). The highest mean was obtained for the *enjoyment* subscale (M = 3.91), meaning that students enjoyed the game. As the mean for *creative thinking* is

also quite high, it can be assumed that the tasks required a significant amount of creativity from the students. It is supposed that the tasks related to travel planning, which were taken from real life with real data from the internet, required creativity especially because there were always some restrictions the students had to work around, such as finding the cheapest or fastest way to travel, at the same time taking into account the amount of money the group owned. There is a quite low mean for the *absorption*, *activation*, and *dominance* subscales.

Table 1. Descriptive statistics for the factors on the GAMEX scale

	Enjoyment	Absorption	Creative thinking	Activation	Negative affect	Dominance
M	3.91	2.54	3.52	2.82	1.63	2.75
SD	0.77	0.90	0.95	0.68	0.84	0.97

Table 2 reports Pearson's correlation coefficients between the 6 factors of the GAMEX scale. There was a strong positive correlation between *creative thinking* and *absorption*, *creative thinking* and *activation*, respectively, *activation* and *absorption*.

Table 2. Pearson's correlation coefficients

		Enjoyment	Absorption	Creative thinking	Activation	Negative affect	Dominance
Enjoyment	Pearson's r	–					
	p-value	–					
Absorption	Pearson's r	0.113	–				
	p-value	0.531	–				
Creative thinking	Pearson's r	0.414*	0.502**	–			
	p-value	0.017	0.003	–			
Activation	Pearson's r	0.097	0.454**	0.569**	–		
	p-value	0.590	0.008	<.001	–		
Negative affect	Pearson's r	-0.437*	-0.030	0.005	0.373*	–	
	p-value	0.011	0.869	0.980	0.033	–	
Dominance	Pearson's r						–
	p-value						

* p < .05, ** p < .01, *** p < .001

2. Motivation and its change during the game

The questions analyzed in this subsection are from the Game Experience Questionnaire. As one of the goals of gamification is to increase motivation (Dichev &

Dicheva, 2017), it is important to know which game elements helped to maintain motivation. Students had to select a maximum of two elements from a given list. According to student reports, teamwork was the most motivating game element; it was selected by 23 students (71.88%). Teamwork was followed by collecting money (18 students – 56.25%), reaching higher levels of the game (12 students – 37.50%), and the frame story (10 students – 31.25%). The points awarded which went towards the students' final evaluation in the discipline were less motivating (6 students – 18.75%).

In the case of a question regarding the types of motivation, the results indicated that the students experienced higher levels of motivation during the game, of whom 14 students (43.74%) felt equally internal and external motivation, 12 (37.50%) were more externally motivated by the frame story, earning money, points awarded for evaluation in the discipline, etc., while only 6 students (18.75%) were intrinsically motivated by the joy of a successful solution, by developing their problem-solving and self-regulation skills, etc. There were more students whose extrinsic motivations increased than whose intrinsic motivation increased, which result is in line with previous studies (Deci et al., 2001; Zsoldos-Marchiş, 2020).

Based on the students' responses to the previous question, they were divided into three groups: those intrinsically motivated, those extrinsically motivated, and those experiencing both types of motivation. ANOVA was used to see if there are differences between the means on the factors of the GAMEX scale of these three groups of students. The results are displayed in Table 3. There was no significant difference in the case of any factor. Analyzing the means, it can be observed that students with extrinsic motivation have the highest mean for the *enjoyment* category, while students with intrinsic motivation have the highest mean for the *absorption* and the lowest mean for the *negative affect* category.

Table 3. Comparing means with ANOVA on the factors of the GAMEX scale of the students reported different types of motivation

	Extrinsic motivation		Intrinsic motivation		Both types of motivation		F	p
	M	SD	M	SD	M	SD		
Enjoyment	4.13	0.88	3.89	0.87	3.73	0.65	0.847	.441
Absorption	2.14	0.99	2.94	0.62	2.71	0.87	2.156	.134
Creative thinking	3.21	1.08	3.67	0.63	3.73	0.96	1.043	.365
Activation	2.71	0.52	2.83	0.30	2.91	0.93	0.263	.770
Negative affect	1.69	0.99	1.11	0.17	1.79	0.86	1.410	.260
Dominance	2.61	1.09	2.94	1.06	2.79	0.92	0.232	.754

Another question was related to the change in motivation during the game. Students had to choose from a list of 5 patterns the one which was most suitable to describe the change of their motivation. In the case of 11 students (34.38%), motivation increased at the beginning of the game and decreased at the end, for 9 students (28.13%) motivation increased at the end of the game, for 6 students (18.75%) motivation did not change during the game, for 4 students (12.50%) motivation decreased at the end of the game, and for 2 students (6.25%) motivation decreased at the beginning of the game and increased at the end. Similarly to the present results, Hanus & Fox (2015) also found that students' motivation decreases with the long-term application of gamification. It seems that 10 weeks were long enough to produce a decrease in motivation in the case of one third of the students, even if their motivation increased at the beginning.

Based on the students' choices from the 5 options given in the previous question, they were divided into 5 groups: those whose motivation increased at the end of the game, those whose motivation decreased at the end, those whose motivation increased at the beginning and decreased by the end, those whose motivation increased at the beginning and decreased by the end, those whose motivation did not change during the game. Comparing with ANOVA the means obtained on the GAMEX subscales for the students of these five groups with different motivation change patterns, no significant differences are obtained in any of the factors, as the results presented in Table 4 show.

Table 4. Comparing means with ANOVA on the factors of the GAMEX scale of the students reported different change pattern of the motivation

	Decrease, then increase		Increase, then decrease		Decrease		Increase		Doesn't change		F	p
	M	SD	M	SD	M	SD	M	SD	M	SD		
Enjoyment	4.08	0.59	3.86	0.90	3.46	0.57	3.93	0.89	4.19	0.57	0.538	.709
Absorption	3.08	0.25	2.53	0.83	2.17	1.67	2.46	0.91	2.75	0.64	0.407	.802
Creative thinking	4.25	0.35	3.46	1.07	3.06	1.53	3.53	0.92	3.71	0.49	0.551	.700
Activation	3.63	0.88	2.98	0.73	2.38	0.78	2.83	0.64	2.54	0.43	1.580	.208
Negative affect	2.17	0.24	1.79	1.16	1.42	0.63	1.59	0.80	1.33	0.52	0.504	.733
Dominance	2.83	1.18	2.61	1.22	3.33	1.05	2.63	0.90	2.78	0.69	0.412	.799

3. Students' opinion about the Seppo game

In a multiple-choice question students had to choose which type of game they liked more: one played moving around in the building to find the tasks or one played on the virtual map. 21 students (65.63%) preferred the version with physical movement. They explained their choice by the enjoyment felt when walking around the building and the excitement to find the tasks hidden in the physical world. 8 students (25%) liked both versions equally, and 3 students (9.38%) preferred the version with the virtual map. The game on the virtual map was liked by the students due to its design and its ability to transport them into a fairytale world. Some of the students mentioned that they preferred the virtual map version, because it took too much time to find the tasks in the physical movement version.

Students were also asked to rate on a 5-point scale how much they liked the two versions of the game (one played moving around physically in the building to find the hidden tasks, guided by the map from Seppo, and the other played on a virtual map on the same platform). Students liked most the game with movement in the physical world (Table 5). As the Shapiro-Wilk test showed deviation from normality ($W = 0.871$ and $p = .001$), the Wilcoxon signed-rank test was used to compare means. The results indicated that the difference between the means for the two versions of the game was significant ($z = 3.014$ and $p = .002$).

In the game, there were three types of tasks: mathematical tasks, travel planning tasks, and questions related to students' self-regulation. The mean and standard

deviation for each type of task is presented in Table 5. Repeated-measures ANOVA was performed to compare the three types of tasks given in the game. The Mauchly test indicated that the assumption of sphericity had been met ($\chi^2(2) = 0.822, p = .663$). The differences in enjoyment for the three types of tasks are statistically significant ($F(2) = 3.976, p = .024$). The Holm post-hoc test shows that the mean for travel planning tasks is significantly higher than the mean for math tasks ($t = -2.354$ and $p = .044$) and for questions related to self-regulation ($t = 2.522$ and $p = .043$).

Regarding the organisation of the levels, students were asked in a multiple-choice question which variant they liked more: where the advancement to a higher level was restricted by the program or where they could choose the level freely. 15 students (46.88%) preferred to choose the level of the tasks they solved, motivating their choice by the feeling of freedom when selecting the tasks and the order in which they solve them. They also reported better time management and work sharing in the team, and a lower level of stress. 9 students (28.13%) preferred the version where access to a higher level was restricted by collecting a given number of points. Students who liked this version more felt a higher level of motivation to solve a problem and to find the correct solution. 8 students (25%) liked both versions equally.

Table 5. Descriptive statistics to evaluate different aspects of the game by students.

	Games played in the building	Games played virtually	Story	Teamwork	Mathematical problems	Travel planning tasks	Self- regulation questions
M	4.50	3.81	4.41	4.31	3.50	3.93	3.46
SD	0.71	0.69	0.91	0.96	0.71	1.07	0.84

Students valued the story of the game and teamwork; these two elements received a high score in their evaluation (Table 5). To find out more about what students liked about the game, an open-ended question was formulated. The responses were analysed using the MAXQDA program. Codes and sub-codes were identified. Three codes were

found: task, game design, and game involvement. The subcodes for each code can be consulted in Figure 3 and Table 7.

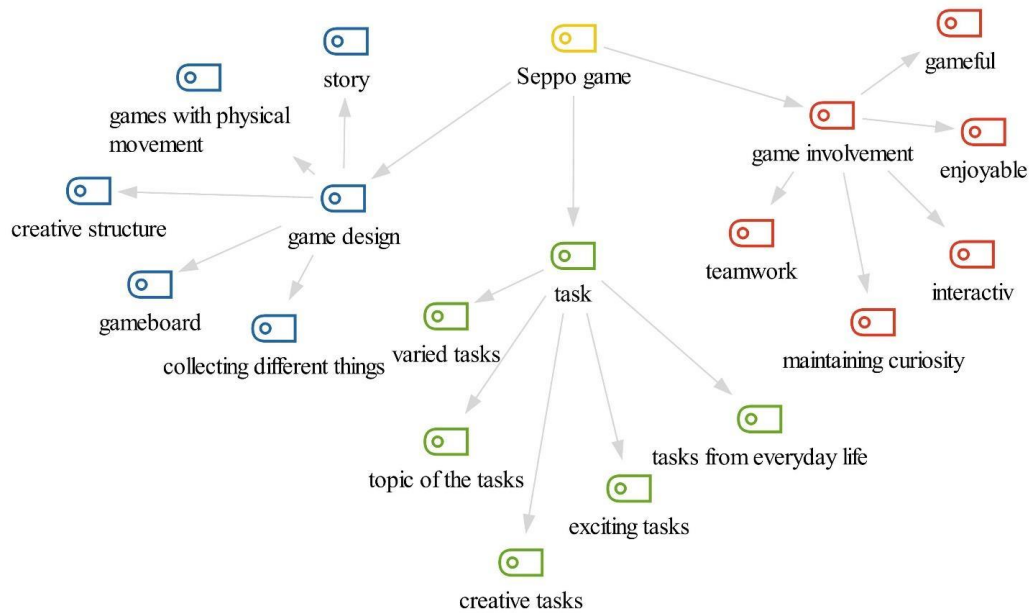


Figure 3. Aspects most liked by students about the Seppo game

Table 6 contains codes, subcodes, and the frequencies for sub-codes and codes. The code 'task' and 'game design' have the highest total frequencies. In the 'task' code, the most frequently used subcode was 'varied tasks'. In the 'game design' code, the most frequently used subcode was 'story'. In the code 'game participation', the most frequently used subcode was 'teamwork'.

Table 6. Student's most likeable things about the Seppo game

Codes	Subcodes	Frequency of the subcode	Frequency of the code
Task	thought-provoking	1	21
	creative tasks	3	
	tasks of everyday life	2	
	topic of the tasks	4	
	varied tasks	8	
	exciting tasks	3	
Game design	story	11	21
	gameboard	2	
	creative structure	4	
	collecting different things	2	
	games with physical movement	2	
Game involvement	teamwork	9	14
	interactive	1	
	enjoyable	1	
	maintaining curiosity	2	
	gameful	1	

4. *Students' perceived stress and stress factors during the Seppo game*

Students were asked to rate their stress level on a scale from 1 to 5. The mean obtained is 2.22 with a standard deviation of 0.98, indicating a low level of perceived stress during the game. Table 7 reports Pearson's correlation coefficients between perceived stress and the six factors on the GAMEX scale. There is a strong negative correlation between enjoyment and perceived stress.

Table 7. Pearson's correlation coefficients

	<i>Enjoyment</i>	<i>Absorption</i>	<i>Creative thinking</i>	<i>Activation</i>	<i>Negative affect</i>	<i>Dominance</i>
<i>Pearson's r</i>	-0.482**	0.225	-0.023	0.096	0.373*	0.159
<i>Stress</i>						
<i>p-value</i>	0.005	0.2156	0.901	0.602	0.036	0.384

* $p < .05$, ** $p < .01$, *** $p < .001$

In an open-ended question, students were asked to explain what influenced their stress level during the game. The answers were analyzed using the MAXQDA program. Codes and sub-codes were identified. The six codes identified are the following: task difficulty, teamwork, personal difficulties, time, competition, and student's competencies. The only code where no sub-codes were identified is the 'tasks difficulty'. In Figure 4 and Table 8 the subcodes for each code can be studied.

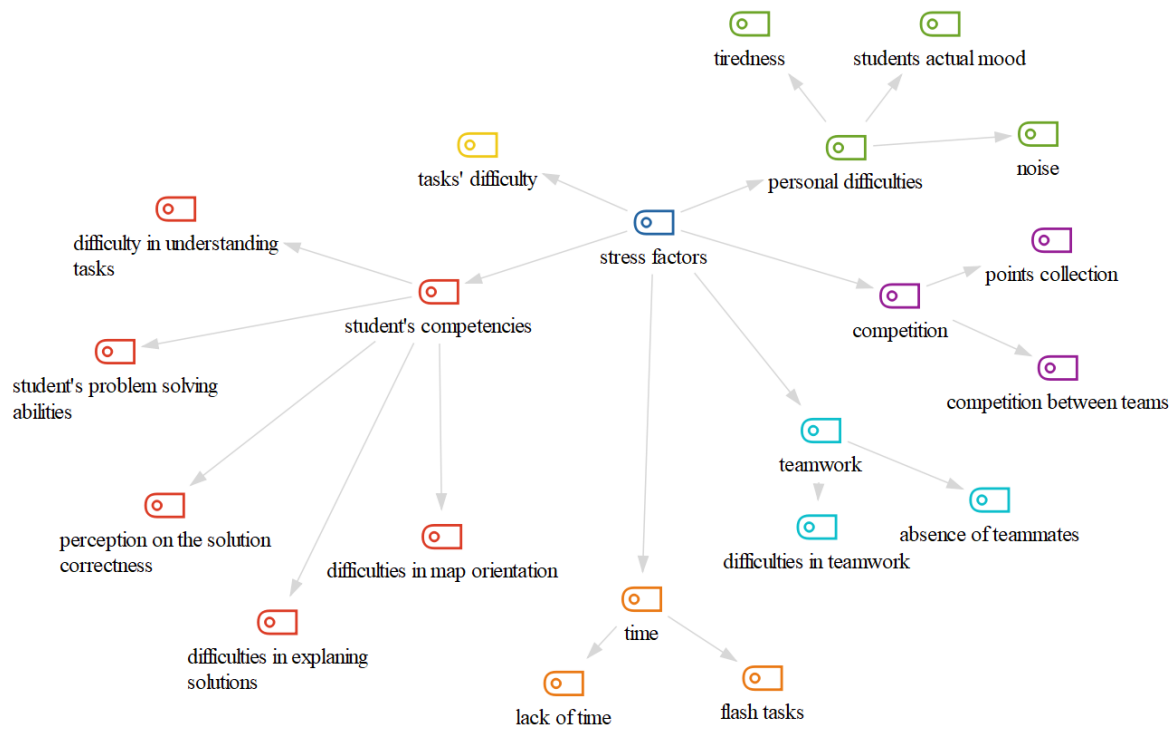


Figure 4. Students' stress factors in the Seppo game

Table 8 contains codes, subcodes, and the frequencies of subcodes and codes. The codes with the highest frequencies are 'task difficulty' and 'student competence'.

Table 8. Student's most stressful factor at the Seppo game

Codes	Sub-codes	Frequency of the sub-code	Frequency of the code
Tasks' difficulty	-	9	9
Teamwork	absence of teammates	2	6
	difficulties in teamwork	4	
Personal difficulties	students' actual mood	1	4
	noise	1	
	tiredness	2	
Time	lack of time	5	8
	flash tasks	3	

Codes	Sub-codes	Frequency of the sub-code	Frequency of the code
Competition	points collection	1	5
	competition between teams	4	
Student's competencies	difficulty in understanding tasks	3	9
	problem-solving abilities	2	
	difficulties in explaining solutions	1	
	difficulties in map orientation	1	
	perception on the solution correctness	2	

Conclusions

Based on the results of the GAMEX scale, it can be concluded that students' enjoyment and the feeling of creativity were quite high, but their activation, absorption into the game, and the feeling of dominance were quite low. There was a strong positive correlation between creative thinking and absorption, creative thinking and activation, as well as activation and absorption. The students preferred the version of the game in which they had to move around the building and had to find hidden tasks significantly more. They enjoyed the story of the game, the teamwork, and the varied tasks. Regarding the tasks, students liked the travel planning tasks significantly more than the mathematical problems and self-regulation-related questions.

The perceived stress during the game was quite low. There was a strong negative correlation between enjoyment and perceived stress. The elements of the game that contributed the most to perceived stress were the difficulty of the tasks, the lack of time, and the competition between the teams.

Regarding motivation, the most motivating elements were teamwork, collecting game money and reaching higher levels in the game. The students were typically driven by both internal and external motivating factors during the game. Generally, motivation increased at the beginning and decreased at the end of the game, but there was a considerable number of students for whom motivation increased at the end of the game.

Students preferred the version of the game with physical movement in the building and they enjoyed the freedom of selecting the difficulty of the tasks when the game didn't restrict advancement to a higher level.

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Private Sector Participation and the Development of University Education in Nigeria's Fourth Republic, 1999-2021: A Historical Analysis

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Abstract: The main thrust of this paper is to historicise the involvement of the private sector in the development of university education in Nigeria in the Fourth Republic. While the first set of private universities began during the Second Republic, the year 1999 marked the commencement of the birth of the second set of private universities in Nigeria. The year 2021 was when the last batch of private universities was granted provisional licences of operation by the Federal Government through the National Universities Commission. There is no doubt that the history of educational development in Nigeria has its origin in the activities of the private sector, that is, Christian missions. Their involvement in the development of western education in the country between the late 19th and 20th centuries was mainly confined to the provision of primary and secondary education. Up to the birth of the Fourth Republic in 1999, the provision of university education in the country was exclusively the responsibility of both the Federal and the State governments. Although an attempt was made during the Second Republic, 1979–1983, to encourage private sector participation, this eventually failed. The present paper argues that availability and accessibility to high-quality university education can be meaningfully achieved through public-private collaboration as seen in developed countries such as the United States, the United Kingdom and Western Europe. Active involvement of non-state actors would help the government to mobilize financial resources to meet more pressing public service needs. The methodology adopted for this work is historical, qualitative and quantitative, utilising materials from both primary and secondary sources.

Keywords: Private Sector, University, Education, Development, Nigeria's Fourth Republic

Introduction

The importance of the provision of quality university education has been recognised as central to the promotion of national development in any society. There is no doubt that access to high-quality tertiary education enriches people's lives, increases their employment opportunities and helps to build a productive skills base to drive economic growth. Every responsive and responsible government wants relevant and efficient tertiary education that meets the needs of students, the labour market and the economy. Therefore, the need to work towards developing and implementing changes to how the educational system is funded, regulated and managed should be vigorously pursued. Hence, the effectiveness of tertiary education in achieving this vision depends largely on the quality of provision and the responsiveness of providers (public and private).

It is imperative to point out here that, in a rapidly changing social and natural environment, higher education plays a varied and complex role in societal development. Thus, without adequate higher education and research institutions providing a critical mass of skilled and educated people, no country can ensure genuine endogenous and sustainable development. Higher education has given ample proof of its viability over the centuries and of its ability to change and induce change and progress in society (Osborne, 2020).

Over the years, the responsibility of managing, funding, and supervising university education in particular and tertiary education in general has solely been that of the government; first, the Federal government, and later both Federal and state governments. This development has caused a number of problems for Nigerian tertiary education in general, such as poor quality, poor funding, the problem of equity/access and inefficiency of the system. These challenges have contributed to some of the reasons why none of our public universities has ever been rated among the top best universities both in the world and in Africa. In most developed countries such as the United States, Britain, and Canada among others, the provision of university education is not the sole responsibility of the government. Both the government and the private sector are major stakeholders in the provision of university education. In other words, they had embraced

the strategy of public-private partnership in tertiary education for a very long time (Patrinos, 2010). Most of the world's best universities are private universities, which are found in the developed countries mentioned above. Notable among them are Harvard University, Massachusetts Institute of Technology, Brown University, Brigham Young University and so on.

Although there is extant literature on the evolution of private universities in Nigeria such as Ball (2007), Osagie (2009) Olukoju (2019) and Adeyemi (2021) among others, none of these works critically interrogate the change and continuity in the growth and development of private universities within two decades of the emergence of the second set of private universities in Nigeria. While some of these existing works such as Ball and Osagie only focused on the evolution of the second set of private universities in Nigeria, Adeyemi's work was restricted to just a state in Nigeria. Between 1999 and 2021, the number of private universities increased from three (in 1999) to 99 (in 2021). By implication, the private sector has emerged as major stakeholder in the provision of university education in Nigeria. This is a major gap that this current research intends to fill in the historiography of the evolution and development of private universities in the Nigeria's Fourth Republic. The current study is a significant complement to the existing literature, with great emphasis on the role played by four successive civilian administrations (namely, Chief Olusegun Obasanjo; Alhaji Umaru Musa Yar'Adua, Dr Goodluck Jonathan; and Major General Muhammadu Buhari [rtd]) through the approval of licences of operation presented before them by the National Universities Commission between 1999 and 2021.

It is against this backdrop that this discourse intends to interrogate private sector participation in the development of university education in Nigeria's Fourth Republic, between 1999 and 2021. The paper is divided into five major sections. Section one is an introduction; section two deals with an overview of the evolution and development of university education in Nigeria between 1948 and 1999; section three focuses on the history of private sector participation in the development of university education in Nigeria between 1999 and 2021; section four interrogates the impact of private sector participation in the development of university education in Nigeria; while section five is the conclusion. The methodology adopted in this paper is historical and thematic, utilising materials from both primary and secondary sources of data collection. The main primary source used for the study was oral interview.

Evolution and Development of University Education in Nigeria, 1948-1999: An Overview

The evolution and development of university education in Nigeria during this period were attributed to both the colonial government and the post-independent government. First, the history of university education in particular and tertiary education in general in Nigeria could be traced to the colonial period. An attempt towards the evolution of tertiary education during the colonial period was facilitated by the educational reforms introduced by Mr ERJ Hussey, who was appointed as the Director of Education for Nigeria in 1929. In 1930, Hussey came up with a new Policy on Education, which addressed all the levels of education (primary, secondary and tertiary). Prior to this time, the provision of western education, which was exclusively in the hands of Christian missions, was restricted to primary and post-primary (secondary) education. With the arrival of Hussey, the need to expand Nigeria's educational system wore a new garment. This development was said to have been facilitated by serious agitations of a few educated Nigerian nationalists, who saw unwillingness on the part of the colonial government to embark on a programme of educating Nigerians beyond the post-primary education level. Hussey's proposal on the review of Nigeria's educational programme resulted in the establishment of the first institution of higher education known as Yaba Higher College, Lagos, in 1932, but officially opening only in 1934 (Falola, 1991). Although this development was a major milestone in the history of higher education in colonial Nigeria, its establishment met intense criticism from Nigerian nationalists on the ground that it failed to meet their demand for quality higher education. Nigerian nationalists saw the creation of Yaba Higher College by the colonial government as serving colonial ideology through producing Nigerians who were playing subordinate roles, rather than stepping into the shoes of the top European officials in government and commerce (Osoba & Fajana, 1980). In spite of the criticism of Nigerian nationalists, mostly from Lagos and other parts of the South, the College remained the first higher education institution in the country up till 1948 when the first university was set up.

The campaign by Nigerian nationalists for the Africanization of the colonial civil service and the provision of more and better educational opportunities took a new dimension in the 1940s. These demands were said to have constituted a part of the global movement in the British colonial empire for the indigenisation of the key institutions of

government and the provision of appropriate educational facilities, without which indigenes who did not have requisite training would find it difficult to take over the running of their countries from the colonial officials and other expatriates. As a result of this, the colonial government, under the leadership of Oliver Stanley as the Colonial Secretary was forced to set up two different commissions geared towards university education in West Africa in particular in September 1943. These two commissions were the Asquith Commission and the Elliot Commission. While the Asquith Commission was set up purposely to look into university education in the British Empire (West Africa inclusive), the Elliot Commission was constituted mainly to look into the problem of university education in West Africa. The two commissions submitted their recommendations (which were similar), explaining that all colonial territories able to support university institutions should have them, provided that their standards were comparable to those of British universities. With respect to the Elliot Commission, there were two reports, namely, the majority report and the minority report. While the majority report recommended that two universities be established in Nigeria and the Gold Coast (now Ghana) and that Fourah Bay College be developed into a third with limited objectives, the minority report recommended only one university in Ibadan, Nigeria, to serve the whole of British West Africa (Osoba & Fajana, 1980, p. 581). The Colonial Office eventually accepted the minority report. Its acceptance led to the establishment of University College, Ibadan; and University College, Legon, Ghana in 1948. Both university colleges were affiliated with the University of London (Adeyemi 2021, p. 3).

The two higher education institutions continued to provide limited tertiary education to Nigerians during the colonial period. However, owing to intense agitations by Nigerian nationalists for the appointment of Nigerians to posts in the Government Senior Service, which required higher qualifications, the Colonial government was again forced to set up another commission in April 1959, known as the Ashby Commission, headed by Sir Eric Ashby. The commission was charged with the responsibility to conduct an investigation into Nigeria's needs in the field of post-School Certificate and Higher Education over the next twenty years (1960-1980). With respect to higher education, the commission, which submitted its report in September 1960, observed a dearth of trained teachers in secondary schools in spite of the obvious increase in demand for their services. Thus, it recommended the opening of universities, the institution of an

undergraduate degree in Education and the training of more teachers for Nigeria's secondary schools (Taiwo, 1980, p. 4). The report of the commission provided a good foundation for the development of degree programmes in teacher education in some of the tertiary institutions that were set up in immediate post-independence Nigeria (Fafunwa, 1974, p. 10).

The development of university education in post-independence Nigeria, especially between 1960 and 1999, could be interrogated under different historical political phases, namely, the First Republic, 1960-1966; First Phase of military rule, 1966-1979; Second Republic, 1979-1983; and Second Phase of Military rule, 1983-1999. During the First Republic, university education in Nigeria witnessed major development. Between 1960 and 1966, university education was expanded in Nigeria. The number of universities rose from one to five. This period also saw the establishment of regional universities beginning with University of Nigeria, Nsukka, set up by the Eastern Regional Government on 7 October 1960. In 1962, both the Western and Northern Regional Governments founded their own universities, namely, the University of Ife (now Obafemi Awolowo University, Ile-Ife), and the Ahmadu Bello University, Zaria, respectively. In the same year, the Federal Government established its own university known as University of Lagos (Omolewa, 1986, p. 220), which was based in Lagos, being the Federal Capital Territory of Nigeria then. Having Nigeria become a republic in 1963, the Federal Government decided to upgrade University College, Ibadan, to a full-fledged university (now known as the University of Ibadan). These five universities were referred to as the First Generation Universities in Nigeria. Following the demise of the First Republic and the emergence of military rule in 1966, the provision of university education was put under the exclusive list. By implication, it was only the Federal Government that had the authority to establish universities in the country. Thus, between 1966 and 1979, which was the First Phase of military rule, eight universities were set up in different parts of Nigeria, namely, the University of Benin (1970), the University of Jos, the University of Maiduguri, the University of Port Harcourt, the University of Calabar, the University of Kano (now the Bayero University, Kano), the University of Sokoto (now the Usman Dan Fodio University, Sokoto) and the University of Ilorin. These universities were referred to as Second Generation Universities in Nigeria (Osokoya, 1994).

With the return to civil rule in 1979, leading to the birth of the Second Republic, the development of university education wore a new garment. The birth of the republic

was made possible through successfully introducing the 1979 Constitution. The constitution removed university education from the Exclusive List to the Concurrent List. By this constitutional provision, the State Governments were granted the constitutional right to set up their own universities. Thus, between 1979 and 1983, there was the emergence of both Federal and State-owned Universities. The first State-owned University to be established in Nigeria was the Rivers State University of Science and Technology (RUST) (now known as the Rivers State University), set up in October 1980. It was formerly known as the Rivers State College of Science and Technology established in 1972, but was upgraded to the university status by Governor Melford Obiene Okilo, who was the first civilian governor of old Rivers State (now made up of new Rivers State and Bayelsa State). Other civilian state governors equally set up their own Universities during this period. These state-owned universities were the Ambrose Alli University, Ekpoma, 1980, the Abia State University, Uturu, 1981, the Ogun State University, Ago-Iwoye, 1982 (now Olabisi Onabanjo University, Ago-Iwoye) and Lagos State university, Ojo, 1983. Also, the Federal Government of Nigeria, under the leadership of Alhaji Shehu Shagari set up its own universities as well, which were specialised universities in the defunct three major regions of Nigeria (North, West and East). These universities were the Federal University of Technology, Owerri, 1980 (Eastern Region); the Federal University of Technology, Akure, 1981 (Western Region); the Modibbo Adama University of Technology, Yola, 1981 (Northern Region); and the Federal University of Technology, Minna, 1982 (Northern Region) (Yusuf, 2017, p. 33).

It is imperative to point out here that during this republic, an attempt was made towards the establishment of the first set of private universities in Nigeria. This became possible through the 1979 Constitution, which permitted individuals, private entrepreneurs and organisations to establish and fund universities in Nigeria along with Federal and State Governments. Consequently, about twenty-six private universities were established in different parts of Nigeria during this period. Notable among them were Imo Technical University, Imo State; Akoko Christian University, Akungba Akoko, Ondo State; God's University, Umuezena, Anambra State; Feyson University, Ijebu-Ode, Ogun State and so on (Osagie 2009, p. 14). However, following the collapse of the Second Republic occasioned by the military takeover of power by Major General Muhammadu Buhari in December 1983, the regime promulgated a decree in 1984 (that is, Decree 19 of 1984), which led to the abolishment of private universities (Osagie 2009, p. 15).

The second phase of military rule, which began in December 1983 and lasted till 29 May 1999, was another important phase in the history of the development of university education in post-independence Nigeria. During this period of military rule, both federal and state-owned universities were founded by different military regimes. In 1985, for example, the military regime of Major General Muhammadu Buhari established the Nigerian Defence Academy, Kaduna. Also, the military regime of General Ibrahim Babangida (1985-1993) initially established three specialised universities in the three defunct regions of Nigeria between 1988 and 1992, namely, the Federal University of Agriculture, Abeokuta (1988) in the Western Region, the Federal University of Agriculture, Makurdi (1988) in the Northern Region, and the Michael Okpara University of Agriculture, Umudike (1992) in the Eastern Region. The regime further founded four new universities, namely, the Abubakar Tafawa Balewa University, Bauchi (1988), the University of Abuja (1988), the University of Uyo (1991) and the Nnamdi Azikiwe University, Awka (1992). There was also an emergence of state-owned universities during this period. Notable among them were Ladoko Akintola University, Ogbomosho (1990); Benue State University, Makurdi (1992); Delta State University, Abraka (1992) and Imo State University, Owerri (1992) (Yusuf, 2017, pp. 30-53).

Although the military regime of General Abdulsalam Abubakar did not set up government-owned universities, it initiated the process that led to the birth of the second attempt at establishing privately owned universities in Nigeria. The regime (which lasted from 8 June 1998 to 29 May 1999), granted Provisional Licenses of operation through the Federal Executive Council on 20 April 1999 based on the recommendation of the National Universities Commission (a federal government regulatory agency charged with the responsibility of monitoring, supervising and maintaining quality academic activities among others in all Nigerian universities) to three private universities. On 10 May 1999, the proprietors of the three universities were presented with Certificates of operation. These three private universities were Babcock University, Illisan-Remo, Ogun State; Madonna University, Okija, Anambra State; and Igbinedion University, Okada, Edo State. However, these three private universities did not commence operation under the regime. They became operational under the civilian administration of Chief Olusegun Obasanjo, who was sworn in on 29 May 1999, which marked the birth of the Fourth Republic (Makinde, 2022).

Historicising Private Sector Participation in the Development of University Education in Nigeria's Fourth Republic, 1999-2021

Generally, there were two major attempts at promoting private sector participation in the development of university education in Nigeria. While the first attempt began during the Second Republic and was unsuccessful, the second attempt started during the Fourth Republic and has been largely successful. The year 1999 marked the genesis of the second attempt at promoting private sector participation in the development of university education in Nigeria. As argued earlier, the foundation for the involvement of the private sector as a major stakeholder in the provision of university education for Nigerians was laid by the regime of General Abdulsalam Abubakar, which granted Provisional Licenses of operation to three universities. The licenses of operation of these universities were later validated by the administration of Chief Olusegun Obasanjo on 30 September 1999. This development enabled the three universities to commence academic activities.

Over the past decade, the globalisation and governing of education through Public Private Partnerships (PPPs) have generated considerable debate as to their meaning, purpose, status and outcomes (Wang, 1999). This debate is particularly heated in the education sector because of the widely-held view that education is a complex social and political activity that should remain largely, if not wholly, in the public sector serving public interests. The rapid expansion of Public Private Partnership in Education (PPPE), which increasingly involves private actors in a range of public sector education activities, including more and more of the traditional arenas of public education systems: policy-making/formulation, curriculum development, education provision, inspection/supervision/monitoring and management, has been well documented in the literature (Hatcher, 2006; Ball, 2007). While some observers argued that PPPE is simply a newer, friendlier face on a longer-standing "privatisation of education" agenda (Hatcher, 2006), others posited that it is an innovative means of financing education that draws upon the best of the public and the private spheres with the potential to resolve deep systemic problems in education systems, such as access, quality and equity (King, 2009). Therefore, whatever the veracity of either position, PPP, which was initially restricted to other sectors, has become a major educational initiative adopted by both developed and developing countries since the birth of the new millennium. For example,

the adoption of PPP by the United States, the United Kingdom and Western Europe in the 1990s, in the education sector in particular, was geared towards bringing the management practices of the private sector into the public sector, improving competitiveness and increasing efficiency. The understanding was that it would make public expenditure more effective and, in some cases, would attract financial investment from the private sector. It was also believed that partnership in education would bring in more finances to run the ailing educational system as well as improve the quality of provision through raising management standards in educational institutions (Hoxby, 2003, pp. 9-65).

Given the significant educational challenges confronting developing countries' tertiary education and the potential need to increase the accessibility, quality, efficiency and accountability of the sector, the adoption of public-private participation in tertiary education became imperative. The need to explore this innovative way of financing and delivering quality university education efficiently and effectively to Nigerians was given adequate attention by the Federal Government of Nigeria following the birth of the Fourth Republic. This could be noticeable in the increase in the number of private universities from three in 1999 to ninety-nine in 2021. This increase was attributed to the frantic efforts of successive civilian administrations that came into power during this period. Owing to the liberalisation of tertiary education by Decree 9 of 1993 (which was not implemented until 1999), which sets strict standards to be met before the National Universities Commission, several private individuals, religious organisations, corporate bodies and entrepreneurs in the country submitted their applications, which culminated in the approval of their universities by the Federal Executive Council. Between 1999 and 2021, Nigeria was governed by four different civilian administrations, namely, the Chief Olusegun Obasanjo Administration (1999-2007), the Alhaji Umaru Musa Yar'Adua Administration (2007-2010), the Dr Goodluck Jonathan Administration (2010-2015), and the General Muhammadu Buhari (retd) Administration (2015-2023). The administration of these four civilian presidents could be grouped into two distinct political parties, namely, the People's Democratic Party (PDP) administration (which comprised the Chief Olusegun Obasanjo Administration, the Alhaji Umaru Musa Yar'Adua administration and the Dr. Goodluck Jonathan Administration) and All Progressives Congress (APC) administration (which involved the General Muhammadu Buhari (retd) Administration). While the PDP administration lasted between 1999 and 2015, the APC

administration began in 2015. It is imperative to point out here that during each civilian administration, a number of private universities were approved. Aside from the initial three private universities, whose licences of operation were validated by the administration of Chief Olusegun Obasanjo, the administration approved an additional 28 universities, while the administration of Alhaji Umaru Musa Yar'Adua granted approval to nine private universities, the administration of Dr. Goodluck Jonathan granted approval to 20 private universities. Between 1999 and 2015, a total number of 60 private universities were approved by the PDP administration (which was in power for sixteen years) in Nigeria.

On 29 May 2015, Nigerian democracy witnessed a major political transformation, with the then ruling party (PDP) becoming the opposition and the then opposition party (APC) becoming the ruling party. This became possible as a result of the success of the 2015 Presidential Election in which the then incumbent President, Dr Goodluck Jonathan (PDP candidate) was defeated by now-incumbent President Muhammadu Buhari of APC; and successfully handed over the reins of power on 29 May 2015. Having taken over power, he continued with the policy of liberalisation of tertiary education in the country. Between 2016 and 2021, under the administration of President Muhammadu Buhari, 39 new private universities were approved by the Federal Executive Council in different parts of Nigeria. Thus, within the space of 22 years of the birth of the Fourth Republic, a total of 99 private universities were established by private individuals, corporate bodies and religious organisations. The table below shows the list of approved private universities by the Federal Government of Nigeria as of 2021.

Table 1. List of Approved Private Universities in Nigeria, 1999-2021

S/N	Names of Universities	Year of Establishment
1	Babcock University, Ilisan-Remo	1999
2	Igbinedion University, Okada	1999
3	Madonna University, Okija	1999
4	Bowen University, Iwo	2001
5	Covenant University, Ota	2002
6	Pan African University, Lagos	2002
7	Benson Idahosa University, Benin City	2002
8	American University of Nigeria, Yola	2003
9	Ajayi Crowther University, Oyo	2005
10	Al-Hikmah University, Ilorin	2005
11	Bingham University, New Karu	2005
12	Caritas University, Enugu	2005
13	Al-Qalam University, Kastina	2005
14	Redeemer's University, Ede	2005
15	Crawford University, Igbesa	2005
16	Lead City University, Ibadan	2005
17	Bells University of Technology, Lagos	2005
18	Kwararafa University, Wukari	2005
19	Crescent University, Abeokuta	2005
20	Novena University, Ogume	2005
21	Renaissance University, Enugu	2005
22	University of Mkar, Mkar	2005
23	Joseph Ayo Babalola University, Ikeji-Arakeji	2006
24	Caleb University, Imota	2007
25	Fountain University, Osogbo	2007
26	Obong University, Obong Ntak	2007
27	Salem University, Lokoja	2007
28	Tansian University, Umunya	2007
29	Veritas University, Abuja	2007
30	Wesley University, Ondo	2007
31	Western Delta University, Oghara	2007
32	Achievers University, Owo	2007
33	African University of Science and Technology, Abuja	2007
34	Afe Babalola University, Ado Ekiti	2009
35	Rhema University, Owerinta	2009
36	Nile University of Nigeria, Abuja	2009
37	Oduduwa University, Ipetumodu	2009

S/N	Names of Universities	Year of Establishment
38	Wellspring University, Evbuobanosa	2009
39	Paul University, Awka	2009
40	Godfrey Okoye University, Ogwuomu-Nike	2009
41	Adeleke University, Ede	2011
42	Baze University, Abuja	2011
43	Landmark University, Omu-Aran	2011
44	Samuel Adegboyega University, Ogwa	2011
45	McPherson University, Seriki Sotayo	2012
46	Elizade University, Ilara-Mokin	2012
47	Southwestern University, Okun-Owa	2012
48	Gregory University, Uturu	2012
49	Evangel University, Akaeze	2012
50	Summit University, Offa	2015
51	Edwin Clark University, Kaigbodo	2015
52	Michael & Cecilia Ibru University, Orode	2015
53	Ritman University, Ikot-Ekpene	2015
54	Hezekiah University, Umudi	2015
55	Augustine University, Lagos	2015
56	Chrisland University, Abeokuta	2015
57	Mountain Top University, Ibafo	2015
58	Hallmark University, Ijebu-Itele	2015
59	Kings University, Ode-Omu	2015
60	Christopher university, Mowe	2015
61	Kola Daisi University, Ibadan	2016
62	Anchor University, Ayobo	2016
63	Crown Hill University, Eiyenkorin	2016
64	Coal City University, Enugu	2016
65	Clifford University, Owerinta	2016
66	Arthur Jarvis University, Akpoyubo	2016
67	Legacy University, Okija	2016
68	Dominican University, Ibadan	2016
69	Admiralty University, Ibusa	2017
70	Spiritan University, Nneochi	2017
71	Precious Cornerstone University, Oyo	2017
72	PAMO University of Medical Sciences, Port Harcourt	2017
73	Atiba University, Oyo	2017
74	Eko University of Medical and Health Sciences, Ijanikin	2017
75	Skyline University, Kano	2018

S/N	Names of Universities	Year of Establishment
76	Greenfield University, Kaduna	2019
77	Dominion University, Ibadan	2019
78	Trinity University, Yaba	2019
79	Westland University, Iwo	2019
80	Al-Istiqama University, Sumaila	2021
81	Anan University, Kwall	2021
82	Ave Maria University, Piyanko	2021
83	Capital City University, Kano	2021
84	Claretian University of Nigeria, Nekede	2021
85	Edusko University, Bida	2021
86	Havilla University, Nde-Ikom	2021
87	James Hope University, Lagos	2021
88	Karl-Kumm University, Vom	2021
89	Khadija University, Majia	2021
90	Maranathan University, Mgbidi	2021
91	Maryam Abacha American University of Nigeria, Kano	2021
92	Mewar University, Masaka	2021
93	Mudiame University, Irrua	2021
94	NOK University, Kachia	2021
95	Philomath University, Abuja	2021
96	Thomas Adewumi University, Oko-Irese	2021
97	Topfaith University, Mkpatak	2021
98	University of Offa, Offa	2021
99	Ahman Pategi University, Kwara State	2021

Source: <https://www.nuc.edu.ng>. Accessed 10 March 2022

Importantly, the establishment of private universities in Nigeria during this period became a major competition between indigenous entrepreneurs on the one hand, and religious organisations on the other. As a result of this development, there emerged two major categories of private universities in Nigeria, namely, faith-based private universities and non-faith-based private universities. While faith-based private universities were the universities established by religious organisations, non-faith-based private universities were the universities established by private individuals and private entrepreneurs. Faith-based private universities could be subdivided into two, namely, Christian faith-based private universities and Muslim faith-based private universities. Christian faith-based private universities were the universities established by different

Orthodox and Pentecostal Missions, which included Babcock University (Seventh Day Adventist Church), Ajayi Crowther University (Anglican Mission), Bowen University (Baptist Mission), Wesley University (Methodist Mission), Redeemer's University (Redeemed Christian Church of God), Anchor University (Deeper Life Bible Church), Samuel Adegboyega University (Apostolic Church) and so on. Muslim faith-based private universities were the universities set up by different Islamic organisations such as Fountain University (Nasrul Lahi L Fathi Society-NASFAT) and Al-Hikman University (AbdulRaheem Oladimeji Islamic Foundation-AROIF). Also, the non faith-based private universities could be sub-divided into two main categories. They were universities established by private individuals (who were either Christians or Muslims) such as Lead City University, Caleb University, Afe Babalola University, and Edwin Clark University; and universities established by private entrepreneurs such as Elizade University and Oduduwa University.

The impact of the Private Sector Participation on the Development of University Education in the Nigeria's Fourth Republic: A Preliminary Assessment

Having briefly historicised the private sector's participation in the evolution and development of university education in Nigeria's Fourth Republic, it is imperative to critically analyse their impact on the development of university education in Nigeria during this period. Evidences from primary (mainly oral interview) and secondary sources revealed that private sector participation in the development of university education in Nigeria cannot be overemphasised. Between 1999 and 2021, the private sector positively impacted the development of university education in Nigeria in no small measure.

One of the major impacts of private sector participation on the development of university education in Nigeria could be seen in the accessibility to university education. The existence of private universities in Nigeria since 1999 has helped to provide additional opportunities to prospective Nigerian undergraduates who could not gain admission into public universities (federal and state) due to limited spaces. There is no doubt that there is a huge demand for university education in Nigeria. This demand could be seen in the total number of candidates sitting for the Unified Tertiary Matriculation

Examination (UTME), which is conducted yearly by the Joint Admission and Matriculation Board (JAMB). The table below shows the breakdown of the total number of candidates that participated in the UTME between 2016 and 2020, as well as those that were eventually admitted.

Table 2. Breakdown of Candidates that participated in the UTME and those Admitted in all the Nigerian Universities, 2016 and 2020 (Selected)

S/N	Year	Total Application	Total Quota	Total Admitted	Unused
1	2016	1,557,017	-	405,467	-
2	2017	1,687,551	-	418,391	-
3	2018	1,558,686	575,687	445,318	130,369
4	2018	1,808,334	560,613	444,947	115,666
5	2020	1,855,072	601,775	422,453	179,322

Source: IO Oloyede, "State Ownership Dynamics, University Councils and The Need for a New Social Contract between Society and University". Paper presented at the 6th Biennial Conference of the Committee of Pro-Chancellors of State-Owned Universities in Nigeria, March 22, 2022

The table above reveals the total number of applicants as well as those that were eventually admitted into various Nigerian universities (both public and private) between 2016 and 2020. From the table, one could clearly see that not all those who sought for admission into various Nigerian universities were eventually admitted. Besides, virtually none of the universities met their yearly quota. This could be attributed to a number of reasons, such as the problem of funds, as well as the challenge of incomplete results and other admission requirements on the part of the admission seekers.

Further justification for the contribution of the private sector to the accessibility of higher education in Nigeria can be seen in table 3 below, which provides detailed statistics of degree admission offered to prospective undergraduates by both public and private universities between 2010 and 2022.

Table 3. Degree Admission by Ownership, 2010-2022

	Federal Universities	State Universities	Private Universities	Total Figure
Figure	2,579,054	1,334,536	273,982	4,187,572
Percentage	61.5%	31.87%	6.57%	100%

Source: Oloyede (2022)

The above table showcases the total number of candidates admitted into the three main categories of universities in Nigeria (federal, state and private) between 2010 and

2022. From the table, one can clearly see that all three main categories of Nigerian universities offered admission to prospective Nigerian undergraduates, though in varying number and percentage during this period. It is evident from the table that while the federal universities took the lead with 2,579,054 (61.5%), and were immediately followed by the state universities with 1,334,536 (31.87%); private universities took the least with 273,982 (6.67%). Arguably, if there were no private universities in Nigeria during this period, the number accepted by them would have been deprived of admission due to limited spaces in the public universities. In fact, as shown in Table 2, virtually none of the universities met their yearly quota of the total number of candidates that were to be admitted. Therefore, the presence of private universities in Nigeria has helped to solve the problem of the lack of admission for prospective Nigerian undergraduates whose parents could afford the high fees paid to the universities in question.

The provision of quality tertiary/university education was another major impact of the presence of private universities in Nigeria since 1999. Quality tertiary education is determined by three main pillars, which are the availability of qualified academic staff; availability, quality and utilisation of learning resources and availability of a safe and conducive learning environment. One major instrument for measuring the presence of these three pillars was the Webometrics Ranking of World Universities. Webometrics Ranking of World Universities, which is an initiative of the Cybermetrics Lab, a research group of the Spanish National Research Council (CSIC) located in Madrid, started in 2004. The main aim of the Webometrics Ranking is to improve the presence of academic and research institutions on the web and to promote the open access publication of scientific results (Webometrics, 2022). Although not all the existing private universities possess these pillars, some of them do. In fact, some private universities in Nigeria have distinguished themselves for the provision of quality university education in Nigeria. These are Covenant University, Redeemer's University, Babcock University and Bowen University. For instance, according to the January 2022 Webometrics Ranking of Nigerian Universities, Covenant University emerged as the second best university in Nigeria in particular. Of the 100 Nigerian universities that were ranked in 2020, 20 of the universities were private universities, occupying various positions. In fact, some of the private universities were ranked ahead of most public universities in the 2020 Webometrics Ranking such as Covenant University (2nd position), American University of Nigeria (31st position), African University of Science and Technology (35th position),

Skyline University of Nigeria (36th position), Landmark University (37th position), Redeemer's University (45th position). These universities were ranked ahead of Kwara State University (46th position), Michael Okpara University of Agriculture (47th position), Abia State University (48th position), Federal University, Dutse (49th position), Edo University (50th position) and so on (Webometrics, 2022).

In terms of the availability, quality and utilisation of learning resources and the availability of safe and conducive learning environment to achieve quality university education in Nigeria, some private universities have made their mark. A good example is Redeemer's University. In 2014, the African Centre of Excellence for the Genomics of Infectious Disease (ACEGID) was established at Redeemer's University. The ACEGID was instrumental in containing the outbreak of Ebola in Nigeria in 2014. Since 2014, the centre has been responsible for diagnosing and containing deadly infectious diseases such as Ebola, Malaria, Lassa Fever and COVID-19. Also, with the outbreak of COVID-19 in 2020, ACEGID Centre at Redeemer's University was named by the World Health Organisation (WHO) and by the African Centre for Disease and Control (ACDC) as an African reference laboratory for genome research. It was not just a Nigerian centre, but also one of the regional repositories and bioinformatics centres in the continent of Africa. The centre was one of the laboratories that were launched by WHO and ACDC for the purpose of reinforcing genome sequencing of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19 in Africa. This international recognition given to Redeemer's University was attributed to the availability of qualified academic staff and learning resources, as well as the conducive learning environment in the university. The Centre, since its recognition, has been sharing information with the Nigerian public on how to mitigate the spread of COVID-19 as well as mapping the first SARS-CoV-2 genome sequence in Africa.

Human capital development/manpower development constitutes another impact of the existence of private universities in Nigeria. According to Okoroafor (2010, p. 71), education and training are major components of human capital development. Erluwua (2007, p.116) sees human capital development as a process of increasing human knowledge, enhancing human skills in vocational and technical education for the purpose of increase in productivity and stimulating the resourcefulness of trainees. Therefore, the achievement of human capital development in any country requires the promotion of different educational programmes, such as the establishment of tertiary institutions for

the training of skilled labour. Since the active participation of the private sector in university education in Nigeria, private universities had contributed to the increase in the number of skilled labour (such as lawyers, scientists, doctors, engineers, nurses, academics, accountants, mass communicators, architects) being produced yearly in the country. As argued by Olukoju (2019, p. 82), some private universities have succeeded in carving out a niche for themselves in certain specialist disciplines, where the concentration of funds and facilities have produced some noteworthy results. He further explains that the performance of graduates of Afe Babalola University and Bowen University in the Nigerian Law School Examinations offers good illustration. Although the numbers of manpower being produced yearly by all the private universities in the country do not match with their public counterparts, their immense contribution to human capital development in many areas of national need remains undeniable. Evidence from oral interviews conducted revealed that some academic staff members who are lecturing in public universities in Nigeria today obtained their doctorate degrees from private universities such as Babcock University and Igbinedion University.

The maintenance of a stable academic calendar in Nigerian universities was another effect of the existence of private universities. As argued by Olukoju (2019, p.84), private universities have succeeded in demonstrating to the whole world that the implementation of five-year strategic plans, which used to be the norm in Nigerian public universities up to the 1970s and is commonplace in other countries, can be re-instituted in Nigeria. This is one of the advantages that private universities have over public universities, which has resulted in even people of middle class choosing them, in spite of their exorbitant tuition fees. This could be corroborated by the statement of Olaide (2018, pp. 1-4) that the maintenance of a stable academic calendar was the initial selling point of private universities in Nigeria. He further explains that these universities had promised and consistently guaranteed that their students would matriculate and graduate within the stipulated time frame of their course of study. The maintenance of a stable academic calendar has become a mirage in most public universities, a fact attributed to incessant strikes being initiated by different unions within public universities such as the Academic Staff Union of Universities (ASUU), the Senior Staff Association of Nigerian Universities (SSANU), the Non-Academic Staff Union (NASU) and the National Association of Academic Technologists (NAAT). Although the unions should not be blamed for going on strike, because this constitutes one of the strategies by which the governments (both federal and

state) are being forced to carry out their obligations to public universities, yet the incessant strikes had contributed largely to frequent disruptions of the university academic calendar.

The existence of private universities in Nigeria has resulted in the emergence of two major important voluntary associations geared towards the development of university education in Nigeria, namely, the Committee of Vice-Chancellors and Registrars of Nigerian Private Universities (CVCNPU) and the Committee of Pro Chancellors of Private-owned Universities (CPCPU). Each of the Committees appoints its own Chairman on a rational basis for a period of two years. For instance, while Prof. K.A Adeyemi (VC, Lead City University, Ibadan) is the current Chairman of CVCNPU (Kuku, 2022), Prof. Tunde Adeniran, the Pro-Chancellor of Afe Babalola University, Ado Ekiti, is the current Chairman of CPCPU (Jacob, 2022). The establishment of these two independent associations was facilitated by the Committee of Vice Chancellors of Nigerian Universities (CVCNU). These two associations are major stakeholders and voices in university education in Nigeria. They have continued to play an important role with respect to the maintenance of high academic standards and excellence in private universities in order to compete with public universities in Nigeria in particular and other universities in the world in general. The voices of the two associations were well pronounced during the COVID-19 pandemic, in which all universities (both public and private), as well as other educational institutions, were shut down based on the directive of the Federal Ministry of Education through the National Universities Commission (NUC) on 23 March 2020. In a separate communique, each of the associations wrote to the NUC providing suggestions and guidelines to enable private universities to re-open. Their communique was based on well-articulated reasons which showed that private universities are in compliance with the requirements of the protocols of the Presidential Task Force on COVID-19 ensuring that the universities can re-open in a safe and secure environment (Olagbemi, 2020).

The promotion and maintenance of high moral standards among students was a significant impact of private universities in Nigeria. The responsibilities of universities in particular and tertiary education institutions in general go beyond academics (teaching, learning and research). Universities are supposed to be important centres of forming social morality. This belief is premised on the ground that for any graduate to be awarded a degree, he or she must have been found to show proof of “character and learning”. Thus,

the university's greatest potential in influencing the moral development of students is in the contribution that it can make to their intellectual development (Terrance, 1991). Although formal education is but one influence among many affecting character development, in our society it is the chief instrument of intellectual development. In this regard, private universities, most especially faith-based universities, have made their contribution. Without a doubt, a modicum of decency and civility underpinned by faith-induced ethical values is being instilled in students in most faith-based private universities (Olukoju, 2019, p.82). In fact, most parents prefer to send their children to faith-based private universities, not minding the cost, due to issues of moral decadence in most public universities such as indecent dressing, drug abuse, cultism, and violence among others. Although there are rules and regulations against these immoral behaviours in public universities, these social vices continue to thrive. The situation is different in most faith-based private universities. Rules and regulations against social vices are not just put in place; they are enforced, and appropriate sanctions are meted out on the culprits. One major faith-based private university notable for the strict maintenance of high moral standards among students in Nigeria is Covenant University. One major advantage that faith-based private universities in particular have over public universities in the promotion and maintenance of high moral standards among students is that they operate a purely residential university system unlike public universities, which operate both residential and non-residential systems. This has helped private universities in ensuring close monitoring of their students.

Concluding Remarks

The foregoing discourse has provided a detailed historical analysis of the evolution and development of private sector participation in the development of university education in Nigeria's Fourth Republic between 1999 and 2021. It argued that the first major attempt at promoting private sector participation in the development of university education in Nigeria was traced to the Second Republic, which lasted between 1979 and 1983. This first attempt was rendered unsuccessful by the abolition of twenty-six private universities by the regime of Major General Muhammadu Buhari through the promulgation of a decree in 1984. The situation remained the same until the return to civil rule in 1999. Although a decree on the liberalisation of tertiary education was issued by the regime of General Ibrahim Babangida in 1993, it was not implemented until 1999, when General Abdulsalam Abubakar became the 8th military head of state of Nigeria. He initiated the second attempt towards the promotion of private sector participation in the development of university education in Nigeria by granting licences of operation to the first set of private universities in Nigeria in May 1999. The licences of operation of these three universities were later validated by the civilian administration of Chief Olusegun Obasanjo in September 1999. Between 1999 and 2021, the successive civilian administrations that emerged in the country made frantic efforts towards encouraging private-sector participation in the development of university education in Nigeria. This is reflected by the fact that there was no administration during this period that did not grant approval to the applications from private individuals, corporate bodies and religious organisations presented before it through the agency of the Federal Government, that is, the National Universities Commission. As a result of this, the number of private universities increased from three in 1999 to 99 in 2021. By implication, the number of private universities doubled the total number of universities in the country, the number of public universities in Nigeria being 98 (with 45 Federal universities and 53 State Universities).

The impact of private sector participation in the development of university education was critically identified and discussed. The study specifically interrogated the social impact of the existence of private universities in Nigeria between 1999 and 2021. The major social impact of the existence of private universities highlighted and discussed included the provision of accessibility to university education, provision of human capital

development, maintenance of high moral standards among students and the maintenance of a stable academic calendar among others. The study concluded that though private universities during this period were confronted with a number of challenges such as inadequate funding, low enrolment, and inadequate academic staff among others, the private sector remains a major stakeholder in the provision of university education in Nigeria. In all, this study is a complement to existing body of knowledge on the history of private universities in Nigeria.

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Learning Impact(s) of Smartphones on South African Rural University Students

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Abstract: Smartphones in some cases are considered a source of distraction for students during teaching and learning exercises. However, with the outbreak of the COVID-19 pandemic, the use of smartphones in educational institutions for teaching and learning purposes has become almost inevitable. Therefore, this study investigates the learning impact(s) of the use of smartphones on South African Rural Higher Education Students (SARHES). The quantitative method was adopted for the study. Convenience sampling was used in selecting the institution of learning, the department, the level, and the 75 respondents who participated in the study. Data were analysed using Statistical Package for the Social Sciences (SPSS) version 25. The findings of the study showed that students are significantly affected by the use of smartphones due to their cutting-edge features and functions, internet access, business advertisements, and mobile entertainment, as well as others. The study therefore highlights the need for conscious, consistent periodic seminars, workshops, talks, and colloquiums designed to help students see the importance of focus, planning and time management in the use of smartphones for learning in order to avoid distractions.

Keywords: smartphones, South African Rural Higher Education Students (SARHES)

Introduction

Education has evolved over time (Winstead, 2021; Fink, 2020) and continues to undergo various forms of transformation (Winstead, 2021; Ashwin, 2019; Leal Filho, Raath, Lazzarini et al. 2018). Using higher education as an example, Ashwin (2019, 1) categorically states that “higher education is about transformation.” This implies that transformation in the education sector is expected to be a common phenomenon, while it promotes different forms of transformation in society (One Planet, 2021; Chasi & Rodny-Gumede, 2020; Leal Filho, Raath, Lazzarini, et al. 2018). The United Nations Educational, Scientific and Cultural Organization (UNESCO) (2021) highlights a number of reasons supporting the need for transformation in education, among which various dimensions of challenges, such as pandemics, climate change, violence, or hateful ideologies, can be numbered. Meanwhile, according to Chasi and Rodny-Gumede (2020), the attempt to transform campuses where teaching and learning activities and other diverse forms of learning take place is an attempt to transform society. This implies that the transformation of a society in some instances hinges on the transformation of educational institutions. This corroborates the results of the work of Uleanya and Uleanya (2021) and Dani and Shah (2016), who hold the view that rural educational institutions are strategically established in certain locations to promote certain transformation. As the ancient Greek philosopher Plato says, necessity is the mother of invention (Whyte, 2009). However, the idea of necessity originates from the age-old concept of needs. Therefore, in an attempt to meet the needs as they arise, creativity was triggered and innovatively used to birth groundbreaking inventions, which have altered the course of human history and have provided human society with several options to meet a single need, as seen in the case of the need for education. The drastic changes that have occurred in the phases of human development have birthed several kinds of learning ranging from traditional learning, commonly called T-learning, to M-learning, otherwise called mobile learning, in an attempt to satisfy the educational needs of human beings.

Traditional Learning (T-learning)

According to Balaji Al-Mahri, and Balaji, (2016), T-learning is a predominant form of education which entails face-to-face learning, wherein the teacher imparts knowledge to the students, provides them with educational materials, and evaluates them through broad assessments in the schoolroom or lecture hall at a specified time. T-learning is teacher-motivated and teacher-controlled (Novak, 2010; Sarrab, Elgamel, and Aldabbas, 2012; Sarrab, Alzahrani, Alwan, and Alfarraj, 2014), and students must be physically located in the classroom to gain the knowledge needed (Sarrab, 2015). Additionally, Ntloedibe-Kuswani (2013) opine that T-learning is directed by the trainer because trainees rely on message transmitted by the trainer. In response to the limits of T-Learning, which include rigidity in learning method and inaccessibility to learning materials, D-learning came into being (Balaji et al., 2016).

Distance Learning (D-learning)

Balaji et al (2016) avers that courses and curriculum in D-learning are offered to those who have the intent to study but cannot sit in a classroom to receive instructions from tutors because they are disabled, employed, or lack sponsors. Alalwan, Alzahrani, and Sarrab (2013) elucidate that experts have come up with another kind of learning that involves the use of information and communication technology and accessibility to electronic media, known as electronic learning.

1. Electronic Learning (E-learning)

E-learning originated in the period 1980–1990 (Hashemi, Azizinezhad, Najafi, and Nesari, 2011). It involves online learning or courses where education is accessible via internet connection, regardless of time or location, with desktop and laptop computers as its basic devices (Balaji et al., 2016). E-learning heightens interaction and adeptness of learning because it offers students with greater ability to interact with their teachers, fellow students, and educational materials (Novak, 2010; Sarrab, Elgamel, and Aldabbas, 2012). However, the mobility of students is restricted due to the nature of the devices used in the electronic learning process. Consequently, a new form of learning known as

Mobile Learning has emerged in recent years based on mobile technologies such as notebooks, wireless technology, and smartphones, which are products of the rapidly changing technological environment (Ozdamli, and Cavus, 2011; Balaji et al., 2016). Thus, Chen, Yen, and Chen (2009) consider smartphones as instruments of M-learning as being extremely significant to students.

2. Mobile Learning (M-learning)

M-learning is a form of learning that requires the aid of mobile devices, or the connection of mobile technology and E-learning (Quinn, 2000; Pinkwart, Hoppe, Milrad, and Perez, 2003). Mehdipour and Zerehkafi (2013) define M-learning as any kind of knowledge acquisition that occurs irrespective of the location through mobile technologies. Geddes (2004) views M-learning as information or skill acquisition through mobile devices anytime and anywhere. Ligi and William Dharma Raja (2017) describe M-learning as the provision of educational materials on personal pocket devices like tablets, mobile phones, PDAs, smartphones, and I-pads. Unterfrauner (2011) sees M-learning as 'E-learning using mobile devices and wireless transmission'. Korucu and Alkan (2011) argue that M-learning is a unique technological phenomenon with its own terminology, in contrast with E-learning which shares the same terms as T-learning. Mehdipour and Zerehkafi (2013) maintain that mobile learning transcends just a combination of words; rather, it is a further developed version of and response to E-learning; therefore, M-learning indirectly means mobile E-learning. Ligi and William Dharma Raja (2017) explicate that M-learning involves the usage of mobile technology to facilitate the acquisition of knowledge at the rhythm of the learner, irrespective of place and time, with or without other ICT gadgets. Furthermore, Ligi and William Dharma Raja (2017) maintain that mobile technologies offer teachers in today's world a platform for a student-centred approach to learning, where students can check learning materials from different sources, generate content, and connect with fellow students anywhere.

3. Efforts Geared Towards Utilising M-learning in Teaching and Learning

Mehdipour and Zerehkafi (2013) reveal that in the last decade, mobile learning has matured from an insignificant research area to myriads of major undertakings across institutes, enterprises, exhibit archives, municipalities and countryside around the world.

The work of Mehdipour and Zerehkafi (2013) further shows that the research carried out on the usage of mobile applications is highly reassuring, as seen in the results of a study financed by the Education Department of the United States. This study focused on the connection between learning and the Educational Game Application for Kids called 'Martha Speaks Dog Party', by the Public Broadcasting Service (PBS). The study reveals that there was a 31% improvement in the vocabulary of children between three to seven years old following daily use of the application for 14 days. Another study of this kind is the one carried out by Abilene Christian University which focused on the use of the Statistics 1 application (Mehdipour & Zerehkafi, 2013). The students stated that they understood the message better and were inspired to succeed after using the Statistics 1 application inside and outside the schoolroom. Tutors supported the comments of the students, stating that learners were more ready for the lessons.

In South Africa, statistics have proven that three quarters of recent internet users, mostly young black people who live on a maximum of R1500 monthly, go online to be informed, to meet people, learn, work, or search for jobs through their mobile phones (de Lanerolle, 2012). To meet the need of these young people to learn in the 21st century context, concerted efforts have been made to use M-learning in the educational sector of the country, as seen in Mxit – a mobile service.

MobileBeyond (2017) describes Mxit as a mobile service and lifestyle company with disruptive technology which provides instant messaging service, mobile voice clips, community-based applications and entertainment mainly to young people in South Africa. Mxit (2018) presents itself as an extremely data-light portable social network with a bionetwork of facilities that offers its users the opportunity to connect with each other in a way that is creative and economical. Mxit was created by an ICT company that deals exclusively in software development and telecommunications operations called Swist Group Technologies (MobileBeyond, 2017) in 2005 (Afolayan, 2016; Mxit, 2018).

Swist Group Technologies was started in Stellenbosch (O'Hagan, 2013) by a Namibian born (Thomas, 2015); University of Stellenbosch communications graduate; computer programmer, technical specialist & consultant Herman Heunis (MobileBeyond, 2017) with seven workers (Afolayan, 2016). Swist Group Technologies grew from a team of eight individuals to more than 100 people due to the rapid growth of Mxit (Thomas, 2015; Afolayan, 2016), which is traceable to the lump sum investment of a multinational

media company named Naspers Limited in Mxit in 2007, giving Naspers Limited a 30% ownership right in Mxit (MobileBeyond, 2017).

In 2011, Mxit already had a user base of 500,000 in Indonesia and was being used in 120 countries (Afolayan, 2016; MobileBeyond, 2017), which, inter alia, included Malaysia, Kenya, India, Indonesia, the United States, Nigeria, Brazil, Italy, Portugal, and Spain, before it was sold by Heunis to Alan Knott-Craig Jr., the founder of World of Avatar; a venture capital firm for about R330 million (Atagana, 2012) to R500-million (Thomas, 2015). In 2013, Mxit had gained popularity among young people in South Africa far beyond Facebook, so much so that it had a user base of 45 million registered users in the country, growing daily by 60,000 new registered members, with 750 million messages being sent every day (Afolayan, 2016).

The landmark growth of Mxit was not surprising, seen from its strategic position in satisfying the needs of young people in going online to be informed, meet people, learn, work or job-hunt through their mobile phones, as well as using myriads of other services which address many aspects of the human life.

In short, Mxit provided a platform for M-learning in South Africa as a nation and across Africa as a continent. Mxit (2018) affirms that it had a great impact in improving people's lives by giving them access to educational, medical, and psychological services at no cost. Despite closing down operations as a profit-driven organisation in 2015 (Afolayan, 2016), Mxit continues to impact lives through The Reach Trust (Mxit, 2018) as it transferred its intellectual property to this charitable arm of Mxit (Thomas, 2015). The Reach Trust was established in 2012 to motivate and improve living by developing ground-breaking and economical mobile solutions, through which free education, health, and counselling services have been offered to 10 million people on their mobile phones (The Reach Trust, 2018).

In addition to the foregoing, the usefulness of smartphones for teaching and learning and other endeavours in different walks of life is immense. However, the question remains: can smartphones really promote teaching and learning, considering all the possible distractions arising from their features. Therefore, this study explores the learning impact of smartphones on SARHES. To achieve the goal of this study, an attempt

is made to answer the identified research question guiding this study: What are the impacts of smartphones on selected SARHES?

Methodology

The present study employed a quantitative method. In this case, only the use of a large number of respondents is acceptable (Kumar, 2019; Creswell, 2014). The convenience sampling technique was adopted for selecting the rural university, department, and category of students and respondents of the study. According to Kumar (2019) and Creswell (2014), convenience sampling enables researchers to select respondents/participants who qualify to participate in the study based on their convenience.

Prior to embarking on data collection for this study, the researchers sought permission in form of ethical clearance. This was issued by the appropriate body in the selected rural institution of higher education in South Africa, which gave the researchers the opportunity to carry out the process of data collection. A questionnaire consisting of two sections was used for data collection. The first section aimed at collecting demographic data from respondents. The second section was aimed at collecting data on the impacts that smartphones have on SARHES. The questionnaire was designed using a 3-point Likert scale (agree, disagree, and indifferent). At the time when this study was conducted, the total number of students registered for the Bachelor of Commerce honours degree programme at the selected rural university was 83. The researchers proceeded to administer questionnaires to the 83 students registered for the programme. However, only 75 of the questionnaires were analysed. This was due to the return rate. The data collected were analysed using the Statistical Package for the Social Sciences (SPSS), version 25.

Results

Analysis and Interpretation of the Demographics of the Respondents

The results of the analysed data are presented in this section, beginning with the demographic information of the respondents, which are presented in Tables 1 and 2. Table 3 is used to present the analysis of respondents' responses to research items in the second section of the questionnaire.

Table 1. Gender Distribution of the Respondents

Category	Frequency	Percent	Cumulative Percent
Male	29	38.7	38.7
Female	46	61.3	100.0
Total	75	100.0	

Table 1 above shows the gender distribution of the respondents in this study, 38.7% of the 75 respondents were male, while 61.3% were female. Therefore, there are more women respondents in this study than there are men.

Table 1. Socio-Economic Status of Respondents

Category	Frequency	Percent	Cumulative Percent
High	10	13.3	13.3
Middle	45	60.0	73.3
Low	20	26.7	100.0
Total	75	100.0	

Table 2 above shows the socioeconomic status of the respondents in this study. 13.3% of the respondents indicated coming from a high socioeconomic background, 60% were from the middle class, and 26.7% of the respondents were from the low level socio-economic background. Therefore, most of the respondents in the study come from the middle-level socio-economic background.

Research Question: What are the impacts of smartphones on selected SARHES?

Table 3: Impacts of Smartphones on Respondents

S/N	Statement/Variable	Agree	Disagree	Indifferent	Missing
1.	The smartphone is a mobile phone with cutting-edge features and functions like game playing, picture display, video viewing, direction-finding, audio/video replay and recording, mailing, social networking, and browsing among others.	96%	1.3%	2.7%	0%
2.	Smartphones have impacted all aspects of life such as business, education, health and social life.	93.3%	1.3%	5.3%	0%
3.	Through smartphones, mobile application markets are now in operation, which includes iPhone, Blackberry, Android, Microsoft mobile application markets.	86.7%	1.3%	12%	0%
4.	Mobile application publishers and distributors enjoy smartphones.	73.3%	4%	21%	1.3%
5.	Service providers are getting large revenue by providing ads as a part of mobile application.	78.7%	0%	17.3%	4.0%
6.	Smartphones have brought effectiveness to advertising in business sectors	94.7%	1.3%	4.0%	0%
7.	Smartphones serve as devices for mobile entertainment where blogs can be updated, videos can be watched and blogged, and music can be heard and blogged.	93.3%	0%	6.7%	0%
8.	Rise in mobile internet access can be traced to smartphones.	93.3%	0%	6.7%	0%
9.	The spread of e-commerce sites is a function of smartphones.	76.0%	6.6%	16.0%	1.3%

Table 3 gives an overview of the variables in the SQ that were aimed at exploring the learning impact of smartphones on the respondents, with their corresponding results from the study in percentages. A total response rate of 100% was recorded for the first variable, “The smartphone is a mobile phone with cutting edge features and functions like game playing, picture display, video viewing, direction finding, audio / video replay and recording, mailing, social networking, and browsing among others” as there were no missing responses. 96% of the respondents agreed, 1.3% disagreed, and 2.7% were indifferent. Therefore, it follows that game play, picture display, video viewing, direction finding, audio / video replay and recording, mailing, social networking, and browsing features and functions on smartphones has significantly impacted respondents in this

study. A total of 100% response rate was recorded for the second variable ‘Smartphone has impacted all aspects of life such as business, education, health, and social’ as there were no missing responses. 93.3% of the respondents agreed, 1.3% disagreed, and 5.3% of the respondents were undecided. Therefore, respondents are not immune to the pervasive impact of smartphones in all aspects of life including business, education, health, and social life amongst others, as most of the respondents agreed. In the same vein, a total of 100% response rate was recorded for the third variable ‘Through smartphones, mobile application markets are now in operation, which include iPhone, Blackberry, Android, Microsoft mobile application markets’ since there was 0% missing response. 86.7% of the respondents consented, 1.3% differed, while 12% were undecided. Therefore, respondents have been impacted by mobile application markets, as most of the respondents agreed. A 99.7% response rate was recorded for the fourth variable ‘Mobile application publishers and distributors enjoy smartphones’, since 1.3% of responses were missing. 73.3% conceded, 4% did not, while 21% neither agreed nor disagreed. A 96% response rate was recorded for the fifth variable ‘Service providers are getting large revenue by providing ads as a part of mobile application’, since 4% of responses were missing. 78.7% agreed, none disagreed, while 17.3% were indifferent. A total of 100% response rate was recorded for the sixth variable ‘Smartphones have brought effectiveness to advertising in business sectors’, as none of the responses was missing. 94.7% agreed, 1.3% disagreed, and 4% were indifferent. A total response rate of 100% was recorded for the seventh variable ‘Smartphones serve as devices for mobile entertainment where blogs can be updated, videos can be watched and blogged, and music can be heard and blogged’, as none of the response was missing. 93.3% agreed, none disagreed, while 6.7% were indifferent. A total of 100% response rate was recorded for the eighth variable ‘Rise in mobile Internet access can be traced to the smartphone’, as none of the responses were missing. 93.3% agreed, none disagreed, while 6.7% were undecided. A 99.7% response rate was recorded for the ninth variable ‘The spread of e-commerce sites is a function of smartphones’ as none of the responses were missing. 76% agreed, 6.6% disagreed, while 16% were undecided. The foregoing reveals that students of the selected rural South African university have been significantly affected by smartphones.

Discussion

The analysis of the data collected, addressing the research question ‘What are the impacts of smartphones on selected SARHES’, reveals that the students from selected rural South African universities are significantly impacted by smartphones. This finding confirms the assertion of scholars such as Chen, Yen and Chen (2009), who declare that smartphones are extremely significant to students as it enhances routine tasks through the availability of limitless information on the Internet, as well as Ligi and William Dharma Raja (2017), who hold the view that smartphones used as devices for M-learning are capable of enhancing educational materials. The results of this study also corroborate the work of Sarwar and Soomro (2013), who affirm that the smartphone has impacted virtually all areas of human society both positively and negatively. Furthermore, this finding reveals that the cutting edge features and functions of the smartphone, internet access, business adverts and mobile entertainment are the most prevalent impacts of smartphones on the students of the selected rural South African university. Sello (2012), assessing the impact of smartphones and regular cellular phones on the education of students from rural South African universities, found that smartphone users exceed regular phone users among students. The prevalent impacts of smartphones on the students of the selected rural South African university, as revealed in the present study, explain Sello’s (2012) findings. It is evident that a transformation can be induced in teaching and learning processes through the inclusion and use of smartphones based on its various features and functions. Attaining such a transformation in educational institutions can have a ripple effect on the experiences in society, as the work of Chasi and Rodney-Gumede (2020) also shows.

Conclusion and Recommendations

Smartphones possess vital features capable of promoting teaching and learning activities. Thus, the inclusion and use of smartphones in learning is expected to improve teaching and learning exercises, as well as enhance the learning abilities of students. The fact that SARHES who are described as being disadvantaged based on a lack of infrastructure and access to quality internet are being significantly impacted by smartphones in different areas and ways, implies that smartphones are crucial for students. However, the potential benefits of smartphones are not likely to be enjoyed if the right infrastructure is not made available, and students are not guided. Thus, the study shows that periodic seminars, talks, workshops, and colloquiums targeted at assisting students to embrace the benefits of smartphone use through planning and appropriate time management are necessary. This would help students remained focused.

1. Limitations and suggestions for further study

The present study was limited to respondents undertaking a Bachelor honours degree in the field of commerce. The finding may not be generalisable. Therefore, it is suggested that similar studies be conducted using two or more rural higher education institutions within and outside South Africa.

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