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The Implementation of E-Learning Solutions at the Eszterházy Károly Catholic University: Experiences and Results

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Abstract: The MOODLE distance learning framework system has been used at the Eszterházy Károly Catholic University since 2010 with varying success. The institution has a research team, whose main profile is the integration of existing and the development of new devices and applications facilitating the monitoring of learning outcomes achieved in interactive, online courses. One aspect of this research is aimed at the evaluation of the satisfaction and digital competences of users, especially instructors and students. The sudden changes brought on by the COVID-19 pandemic have clearly illustrated that neither students, nor most instructors were ready to meet the methodological and technological challenges posed by digital instruction. The scope of this research program was extended to school libraries as the latter represent a significant portion of the quality indicators in a given school. Our study introduces the pandemic-related anomalies that emerged in the higher education, public education, and the related library spheres.

Key words: COVID 19, pandemic, digital education, higher education, public education, school libraries

1. Introduction

According to a saying, instead of simply accepting setbacks, we should strive for the elaboration of suitable solutions. The researchers of our university and department follow this principle while performing scholarly inquiry and publishing the respective results.

Relevant research findings have undoubtedly proven that we have to return to the roots of the educational design process in order to reconsider the very foundations of the programmed education schemes introduced earlier. (Skinner, 1954; Fuchs, 1969). We need to go back to the starting point in order to gain a full understanding of this process which can potentially help us to make users, mostly students understand, that we are facing inevitable changes. Meeting the attendant changes is naturally up to us.

What should we informatics professionals, do? Even though we receive more than a desirable amount of sometimes negative feedback, we have to listen to and accept critical views and opinions. Consequently, we performed a comprehensive research in order to highlight a variety of factors negatively impacting the educational arena in light of the pandemic in 2020.

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Since its introduction in the 1960s programmed education has been part of the research profile of the Eszterházy Károly Catholic University. As our institution is committed to keeping up with international trends and developments, our research efforts culminated in the implementation of internet-based distance learning programs in the beginning of the first decade of the 21st century. Research requires continuous reflection on previous inquiries and results and more often than not we can confidently utilize our findings and experiences.

Digital transformation (Racsko, 2017) is not only an essential and widely popularized concept, but strives to be an integral part of our everyday lives. The respective research results highlight several significant issues or points for further consideration:

- When did the process start?
- Why did digital transformation become necessary?
- What are the advantages and disadvantages of the process?
- Has full digital transformation been achieved and to what extent?
- In which areas were digital transformation efforts unsuccessful or encountered substantial difficulties?
- Is the need for digital transformation accepted by everyone, does everybody support it? (natural option, incapability, "compulsion")

While digital transformation is an important and inevitable task of the present and the future as well, the present study does not aim to provide all the answers. We merely hope to offer help for a better understanding of this phenomenon.

The benefits of applying ICT for educational purposes have been demonstrated by numerous scientifically proven research results. One of the most often highlighted advantages of computer-based applications is the respective motivational impact as several findings substantiate practical experiences among them that using ICT devices on their own can have a significant motivating capability (Antal, 2020).

Although listing the existing capabilities, goals, and options appears to be banally simple, these steps were all but ignored at the beginning of last year when we still believed in our ability to find a solution for any problem.

Unfortunately, we had to realize that the COVID-19 pandemic posed heretofore unknown challenges in the arrangement and delivery of instruction both from technological and implementation aspects. Consequently, we used this opportunity to explore the current condition of public and higher education in Hungary in light of digital transformation and the given digital competences. The Department of Human Informatics of the Eszterházy Károly Catholic University has researched the following themes for several years: digital transformation, digital pedagogy, digital library pedagogy, and digital multiliteracy (Lengyelné, Szűts, & Racsko, 2020). We would like to introduce research results pertaining to free software, services provided by schools and other organizations, and the views of teachers using school libraries concerning the present situation.

2. Higher Education

In order to modernize the higher education process several e-Learning framework systems have been introduced. The increasing number of accessible courses can provide a potentially successful alternative to face to face delivery schemes. The MOODLE system was implemented in the Eszterházy Károly Catholic University in 2010 and has been used ever since with varying success. Simultaneously with the introduction of the MOODLE, a research group was organized. Its main task is the integration and development of devices and applications facilitating the monitoring of learning outcomes achieved in this framework system. One part of this research is

aimed at the assessment of the satisfaction and digital competence level of students and instructors using the system. While most of our instructors have not taken advantage of such options, the pandemic compelled both students and teachers to use the MOODLE system regardless of familiarity. Research findings indicate that neither students nor instructors were ready to meet the methodological and technological challenges of digital education.

2.1 The Legacy of the COVID-19 Pandemic

Paradoxically the pandemic situation afforded an ideal opportunity for testing, identifying of deficiencies and analysis of the operation of the university's e-learning system as both full and part time training was shifted to an online basis from the beginning of March 2020. Only one week was allowed to create the conditions enabling both students and instructors unfamiliar with the MOODLE framework to use the respective system.

The online video training program prepared by the Institute of Digital Technology introduced and explained such essential steps as entering (registration), establishing courses, uploading and sharing content, monitoring knowledge acquisition levels and allocating or pairing student groups with the given courses. Since videoconferencing options were not available in the MOODLE most instructors turned to solutions provided by ZOOM or Microsoft Teams.

2.2 The Research Process

The purpose of the project was to respond to the needs of students and instructors by making the MOODLE system simpler and easier to use. While we have relevant findings concerning the use of the system, those are rather limited as not all students and instructors were compelled to rely on it.

The project focused on the following themes:

(1) Analysis of the services provided by the MOODLE (LMS) system to competence-based training options.

(2) Research into relevant domestic and international solutions, introduction of best practices with special attention to approaches viable within the applied learning management system of the EKU.

(3) Collection of student and instructor opinions, experiences, and suggestions related to the use and efficiency of the system.

(4) Analysis of the respective data and the preparation of a development plan for the modification of the most problematic functions.

(5) Programming, testing, and the final integration of the given results in the MOODLE application.

The present article introduces the results of the analysis of students and instructors' opinions, experiences, and proposals facilitating a more problem-free and efficient operation.

Students and instructors' opinions were gauged via an Unipoll questionnaire containing 20 questions for each group and we conducted micro or mini interviews as well. Our goal was to seek answers facilitating comparison and provide useful information concerning implementation with results pointing out areas in need of development within the MOODLE system.

The questionnaires disseminated via the Neptun system were completed by 82 instructors and 681 students.

2.3 Results

Below I introduce the results of the questionnaire pertaining to usability and the presently available services of the system and their respective efficiency.

Most questionnaires were completed by the students and instructors of the Faculty of Pedagogy and the Faculty of Informatics as the MOODLE is used most frequently in these institutional segments. 61% of students completing

the questionnaire were carrying full time study loads (Figure 1).

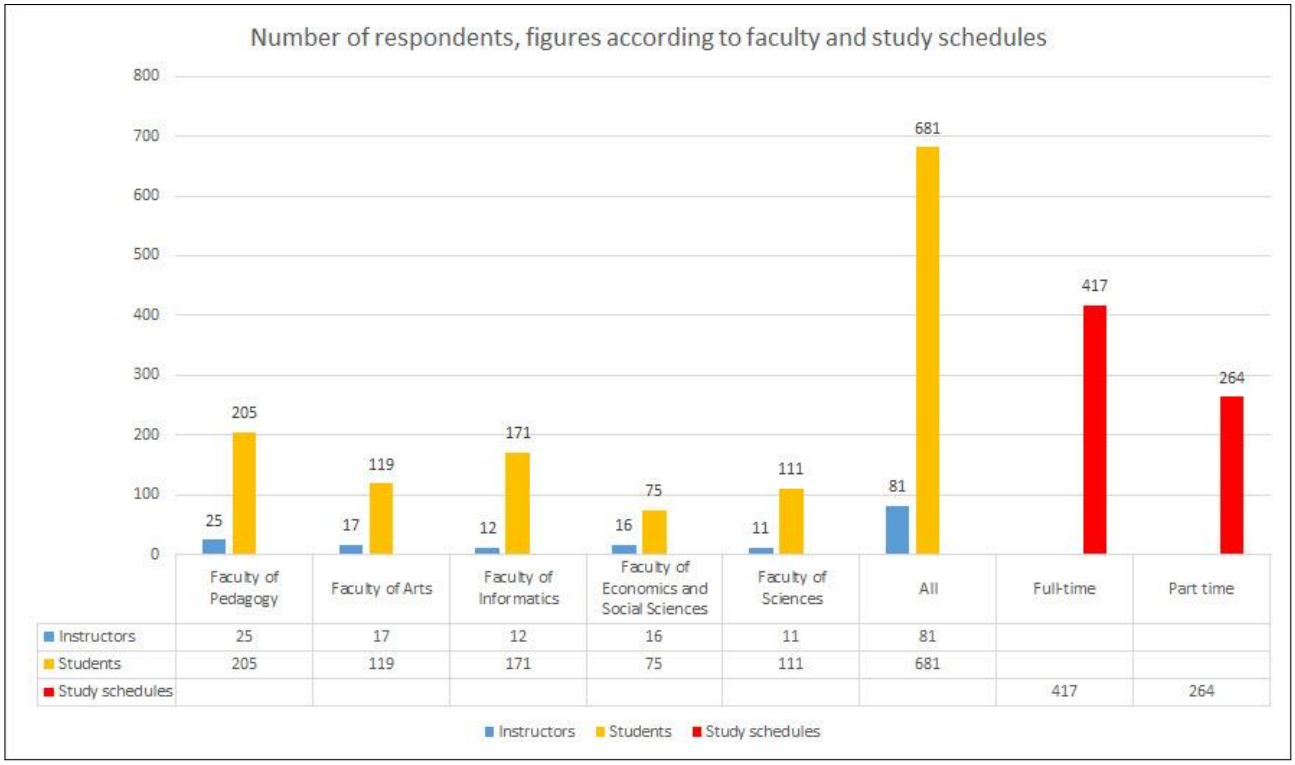

Figure 1 Questionnaire Completion Figures According To Faculty and Study Schedules

The first group of questions focused on the usability of the surface and its general image (webdesign) held by both groups. The results revealed that approximately 80% of the users were satisfied with the operational features. Consequently, nothing had to be modified in the MOODLE (Figure 2).

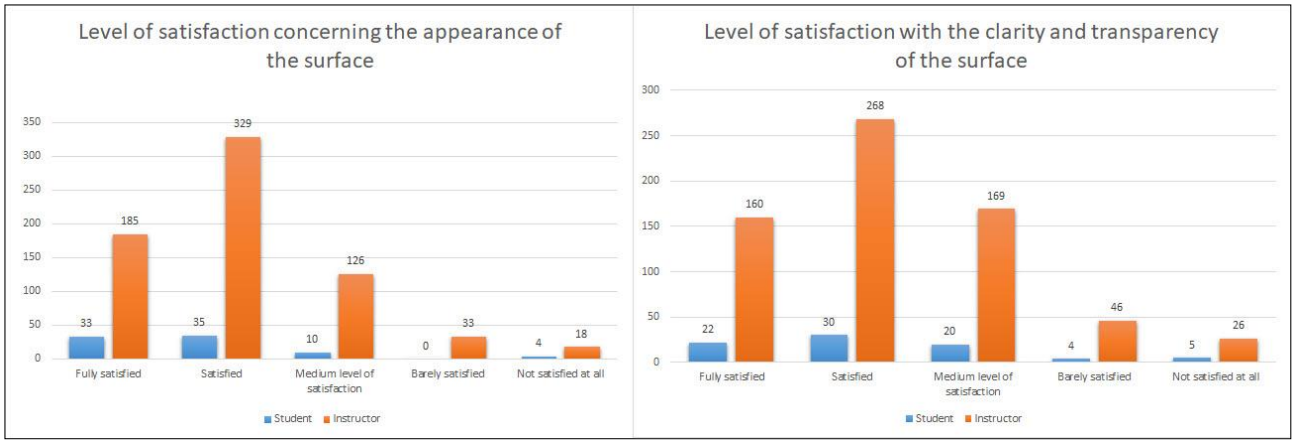

Figure 2 Responses Related To the Quality of Webdesign

Then we asked respondents which type of media they preferred to use for sharing information and what type and form of content and task sharing options they relied on. Students were asked to list the services they have used. The results indicate that 90% of instructors shared educational materials mostly in textual form, a solution not necessarily preferred by the e-learning approach. On the positive side it must be noted that all of the potential options

were utilized, perhaps with one exception: video recordings of classes. It is noteworthy, however, that 44% of our colleagues have used interactive materials as well (Figure 3).

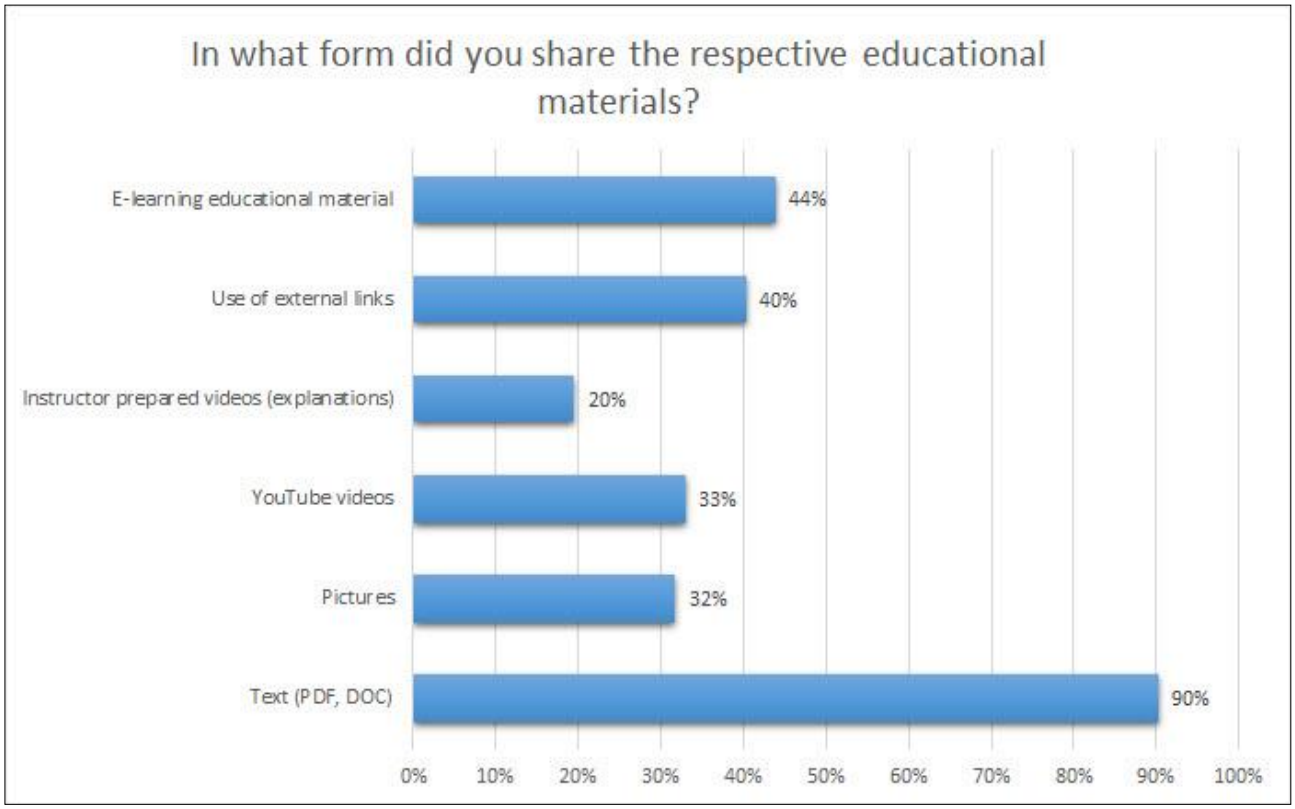

Figure 3 Types and Percentages of the Applicable Educational Content Sharing Options

As far as available services are concerned it is noteworthy that instructors believe that the rate of electronically disseminated educational materials is high, but this figure includes educational content in simple electronic text form as well. The most frequent approaches included the issuing of assignments and the identification of external source links as more than 50% of the users disseminated such tasks.

The greatest difference can be distinguished between students and instructors' views of the video recordings of teacher presentations. This must be due to the fact that students considered not only the recordings of the lectures or seminars as teacher video presentations but those from other sources as well.

A high score was awarded to the category pertaining to maximalization of examination options provided by the MOODLE as 51% of the instructors took advantage of this feature.

Regarding communication services (chat, forum) approximately 50% of both groups used the MOODLE for such purposes (Figure 4).

Instructors encountered several difficulties during the use of the examination options of the MOODLE system as represented by the following chart. The drawbacks included difficulties in the export and import of tests and questions, the fact that not all question types are supported by the system and the editing surface is not easily viewable. Additionally, the evaluation surface along with the control, feedback and administration features related to submitted assignments is hard to use. Almost half of the instructors were dissatisfied or unclear with the use or operation of the system due to at least one of the abovementioned reasons (Figure 5).

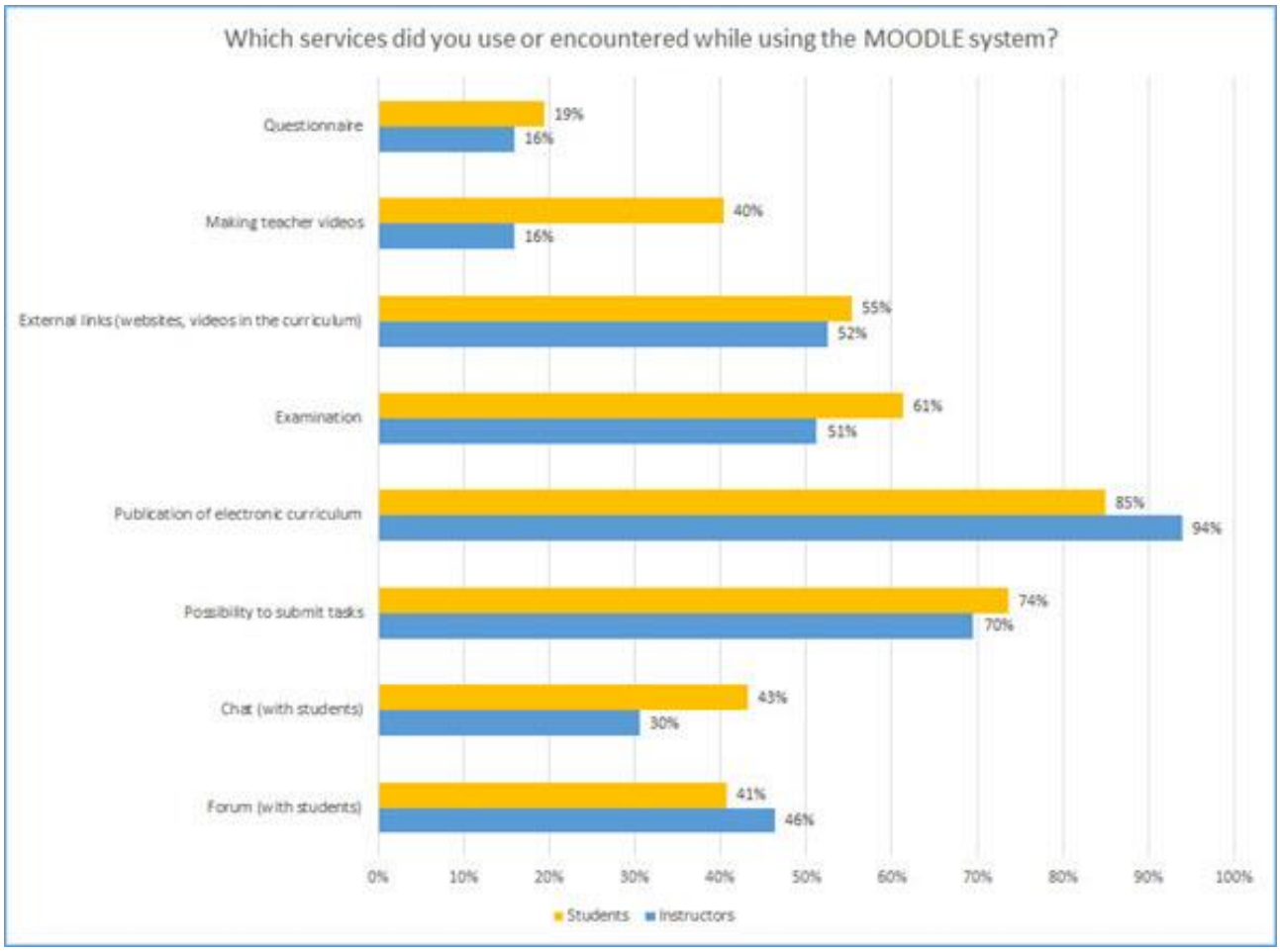

Figure 4 Results Related To the Use of Content Sharing and Communication Services Provided by the MOODLE System

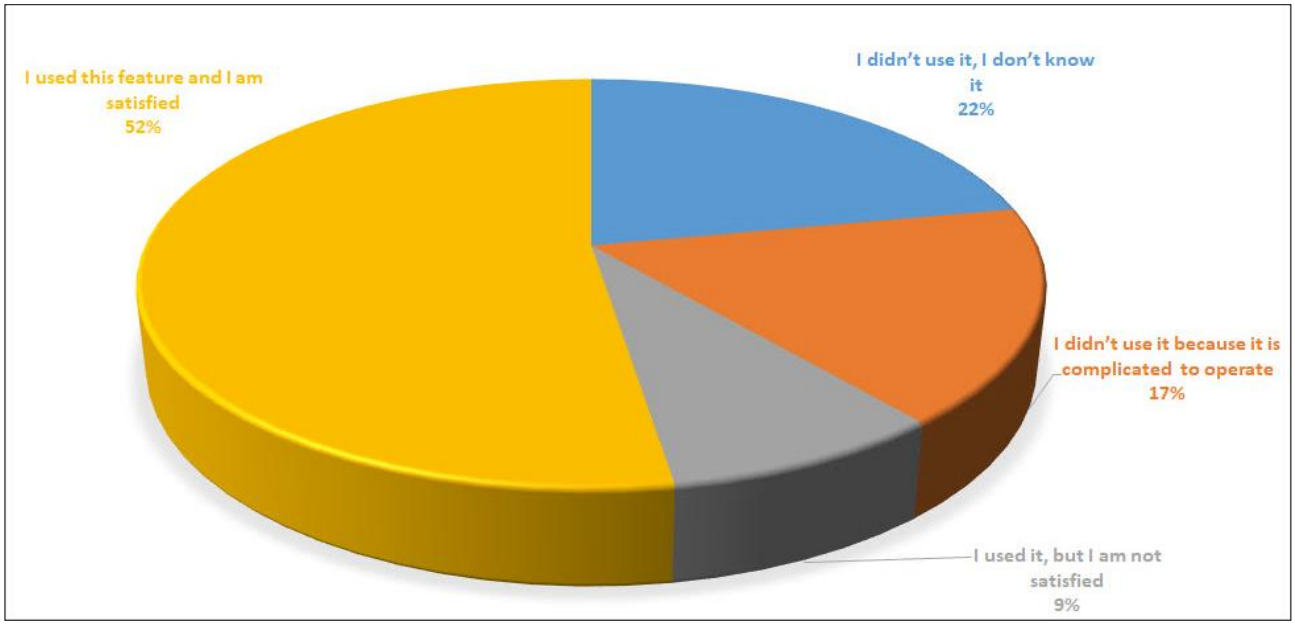

Figure 5 Results Related to the Use of the MOODLE Provided Examination System

In the following section we inquired about the greatest difficulty encountered during the use of the system. Over 50% of students and teachers singled out their lack of experience. The intricate and complex navigation along with the lack of structure posed the greatest challenge to instructors. Students highlighted entry-related difficulties and the limited information about the use of the system as the main obstacles. It must be noted that 22% considered the training unsatisfactory. At the same time more serious problems include navigational or orientational difficulties, the lack of highlighting and uniform course structures and arrangements (Figure 6).

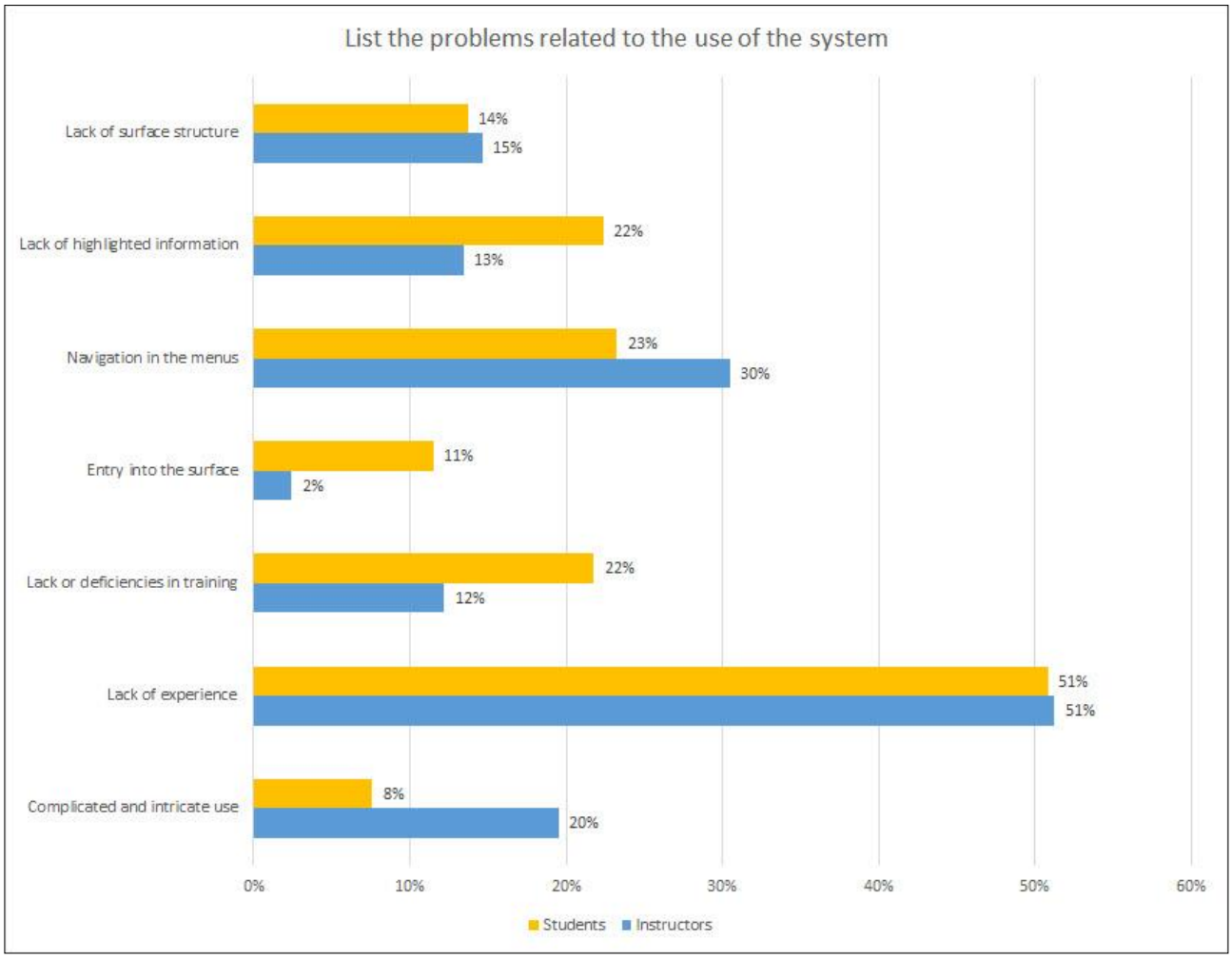

Figure 6 Results of the Satisfaction Test

2.4 Instructor Opinions Concerning the Use of the MOODLE System

In addition to questionnaires we administered mini-interviews online, participants answered the questions on a voluntary basis. We aimed to obtain detailed information about the problems the questionnaires were not able to identify while enabling the respondents to provide specific answers. We collected the most frequent answers and evaluated them according to viability and implementation options. I introduce the summary results below:

(1) The state of the submitted assignments is hard to follow (i.e., whether the given instructor has already corrected them). While this point was raised by several instructors, the progress of the submitted assignments can be monitored in the system if points are awarded to the given submission.

(2) Not all submitted assignments can be corrected or sent back (partially applicable). Instructors can make corrections which are visible for the students and students can react to or comment on the given remarks.

(3) Difficulty in exporting and importing of tests. This is a real problem, it has to be corrected gradually by allocating the appropriate parameters, but the translation of the selected options is not clear.

(4) Difficulties related to test preparation. The test preparation surface is not easy to operate. It requires a high amount of concentration from the user as errors are easy to be made. It must be noted that the surface is not fully transparent either.

(5) Setting of tests, e.g., awarding points is difficult. In case of sharing tests the greatest problem is the allocation of the tests to the appropriate persons or groups. Parameters can be assigned, but settings must be adjusted at each attempt.

(6) Lack of real time communication option. The current version of the MOODLE does not support online videoconferencing.

2.5 Student Observations Related to the Use of the MOODLE System

(1) The system freezes during testing and it is generally slow. This is not a problem of the system as it is either caused by the server or the host.

(2) Courses are not clearly arranged, students cannot determine which semester the particular subject or course belongs to. Unfortunately, this is a valid complaint since teachers can, but students cannot monitor which semester a given course is allocated to.

(3) Subjects students have not yet taken or have already completed are visible (students do not have the delete option). This is a problem on the side of the instructors, but can be corrected easily. The surface could be made more transparent by reducing the number of the parameters.

(4) In case of tests everybody, even those who do not take the test are notified. This is the problem both for the students and teachers. It can be corrected by adjusting the setting.

(5) There is no option for real time video-based communication. This is a problem both for students and teachers, currently it cannot be solved.

(6) Lack of transparency on chat surface (it occurs if it is used by several people at the same time). Presently it cannot be solved.

(7) Submission dates should be highlighted and the system should send a warning concerning the respective deadline. This modification is necessary to eliminate deadline-related anxiety.

(8) Deleting old data (dates, forum notes, group information). Similarly to the previous concerns this is an important issue and can be solved only by the instructor. The delete function cannot be automatically activated and it is complex to operate as well.

(9) Message sending to specific groups. This problem can be solved.

(10) Lack of uniform course structure. While this problem can be eliminated by the use of course templates, the system encourages individualized course development.

2.6 Conclusions

The results of the questionnaire reveal that both students and instructors encounter uncertainties while operating the MOODLE surface. Several problems (deleting old data, deleting students from course lists, assigning appropriate current dates, determining which part of the test should be visible for the students) can be solved by teachers or students with limited experience. Student requests often overlap with these concerns. Yet certain

modification proposals such as the implementation of a fully uniform course structure, improving the transparency of the chat surface, uniform subject structure and online video conferencing are presently not viable due to the design and construction of the system.

Consequently, during the implementation stage we focused on those challenges that simplify the use but do not fundamentally change the structure of the surface.

Based upon the experiences and requests the following changes appear to be viable and can be implemented while reflecting the project goals:

(1) While at the end of the courses instructors have the option of archiving the course or putting the course on stand by, it is a multistep, complex process. One of the respective programming tasks include the unification and optimalization of the two operations according to the experiences obtained.

(2) The preparation of downloadable test templates in Microsoft Word whose content can be imported into the MOODLE system without further editing.

(3) Mandatory allocation of groups in case of handing out assignments especially when an instructor teaches more than one group in a given semester. The setting should be adjusted to notify only the relevant students concerned.

(4) The system should send a warning concerning the submission deadline at a determined date.

(5) The system should check e-mail addresses before it is used for the first time in order to help students and instructors to register.

3. Public Education

3.1 School Libraries, Librarian Teachers as Indicators of School Performance?

In this field digital transformation poses more challenges than previously thought. Why should we address this issue, why do we start with the school libraries instead of the schools? School libraries comprise a large percentage of the quality indicators of a given school. If a teacher is not aware of the professional literature and source materials available for studying in the library of the particular education institution, that is certainly a problem, but it is even worse if the instructors do not point out the existence of such sources and facilities to students. This, however applies not only to classes in Literature or History, but to all disciplines!

Furthermore, in light of the previous chapters the school library is an ideal practice site for subject teachers, librarian teachers, prospective in-service teachers, and students. Consequently, teacher training is closely related to schools and libraries. While this appears to be obvious, digital transformation tends to modify this correlation with potentially positive and negative consequences. Let’s take a look at the opinion of school librarians, subject teachers and librarian teachers concerning the condition of school libraries.

The impact of the COVID-19 pandemic has not been given as much priority in case of school libraries since most attention was paid to continuing schooling and thereby saving the education process. At the same time everyday library pedagogy practice raises rather complex questions involving maintaining organizations, institutional management, librarians, librarian teachers, subject teachers, primary school teachers, and students.

3.2 Everyday Digital Practice in Education and in the School Library in 2019–2020

The present research primarily focuses on the role and options of school libraries with special attention to supporting digital educational services and that of digital library pedagogy.

3.3 Digital Library Pedagogy

Linking education and the electronic world is not a new idea as it is basically simultaneous with the emergence of computers. Walter R. Fuchs (1969) had discussed this issue in the 1960s. In a chapter titled "What comes first, the school or the computer?" of his book published in 1969 he explored instruction machines and programs. The development in this field has been substantially documented both internationally and in Hungary and such concepts have gained everyday use as e-Learning and blended learning, etc. The primary focus is on the theoretical and practical aspects of digital existence, and especially education. One result of such research and development efforts is the rise and increasing prevalence of digital pedagogy.

We must also ask whether the infrastructure of the school library is suitable for the fulfilment of the related tasks?

Positioning the school library in the digital age is not an easy goal to achieve. At first we must consider its loss of function due to the advance of the digital world. To what extent does the option of downloading the books and learning resources to digital devices discourage today's youth from visiting libraries?

While its undoubtable that the digital age compels school libraries to assume a new role, this does not mean that the traditional library functions become fully obsolete. Furthermore, the expansion and increasing prevalence of digital technology could generate additional tasks for libraries. The Internet facilitates on-demand access regardless of location but does not help in the selection of appropriate information from the myriad of online data or limitless number of documents. Moreover, students receive minimal support for critical use of the World Wide Web, that is distinguishing valuable information from harmful or damaging content. In this field school libraries, and librarian teachers can play a crucial role.

Unfortunately, school libraries encounter the greatest problem in the area of financing since where the material resources are insufficient for the increasing of volume numbers, virtually no possibility exists for the acquisition of informatics devices. On a positive note, various project grants and successful tender applications have alleviated this situation recently.

All in all, we can conclude that the digital age does not threaten the future of school libraries and can even foster the growth of a uniquely characteristic library environment.

3.4 Teachers' Views on School Libraries (2020)

As Marshall McLuhan asserts the previous model of the typographic man has become obsolete. Considering knowledge as the sum of all information available from various written and printed sources it emphasized possession. This paradigm was superseded by the electronic man, "prioritizing not the ownership of knowledge, but the ability to orient oneself in the endless stream of electronically available information" (McLuhan, 2011).

Librarians capable of using the relevant technology and having access to desired data bases are ideal for enabling people to orient themselves in the unlimited information flow. In addition, libraries as locations for meeting, learning, and collaboration fulfill an important social function too. The library as an institution committed to the transmission and dissemination of culture and values has a crucial role and responsibility in the formation of conscious and critical use of digital technology.

Following the IFLA 2019 trends a comprehensive approach is needed in skill development and the promotion of learning, in other words, libraries should foster the aptitude of lifelong learning. Thus in addition to fulfilling previously expected traditional tasks and responsibilities, libraries must participate in digital competence development while functioning as a digital education support center (IFLA, 2019).

Our efforts are primarily directed at pointing out the existing problems to teachers.

3.5 The Results of the Teacher Survey

Our survey is not fully representative as we administered our inquiry to teachers of the public education sphere nationwide. Although we disseminated our survey twice, we did not receive sufficient amount of answers. Altogether 1200 teachers responded and shared their opinion on the condition of school libraries.

Although the questionnaires and crosstables comparing the respective data with the infrastructural information of school libraries are being evaluated presently, we have gained a reliable perspective concerning the use and the rate of the respective communication devices and training management systems.

Based upon answers provided by the relatively large sample we can conclude that a high number of available training management systems, communication systems, and social platforms are guarantees of efficiency. Several communication systems and applications help learning and research efforts, while even one application can provide entertainment.

3.6 The Use of Various Communication Systems: Teams, Zoom, Google Meets, etc.

A part of those surveyed cannot point out the exact difference between platforms primarily used as communication systems and training management systems. The various systems are used in a rather diverse manner. As a result of the pandemic this not always desirable heterogeneity intensified. Due to a lack of sufficient time a viable perspective did not develop in case of freely accessible software. Thus the full spectrum of training levels could not be authentically and efficiently addressed and educational policy makers could not make appropriate decisions to facilitate the structured and more organized use of the given software.

The following diagrams illustrate these findings (Figure 7, Figure 8). While, the survey is not fully representative, the respondents cover all types of schools.

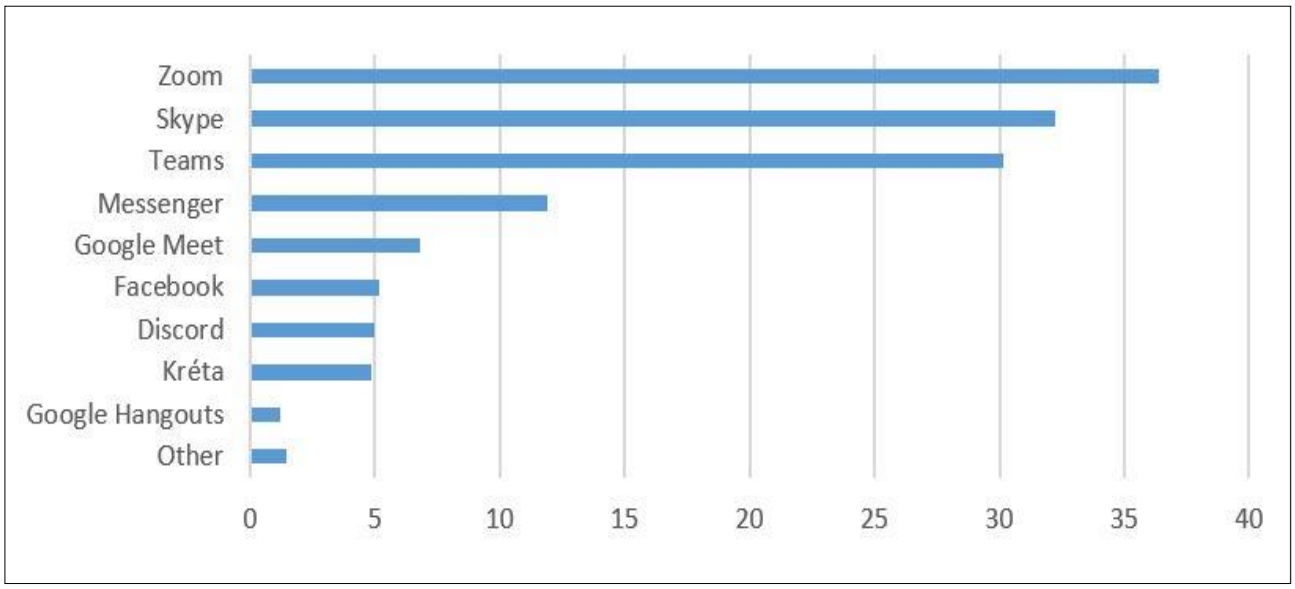

Figure 7 Which Communication Platform Have You Already Used During Online Instruction? (%) (Number of Resp.: 1160)

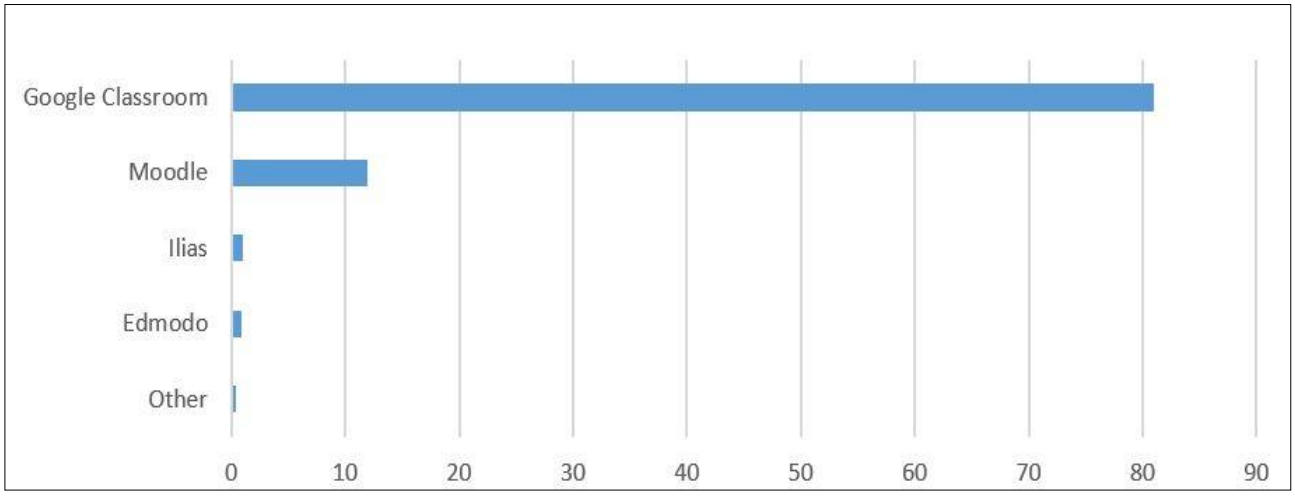

Figure 8 Which Training Management System Have You Already Used During Online Instruction? (%) (Number of Resp.:1160)

3.7 The Current Condition of School Libraries

Digital transformation is not merely a question of money and/or methodology. Most school libraries are not sufficiently equipped to implement this objective. Although the importance of the school library as a resource center has waned, larger schools in which the given venue, employees, and teaching staff are prioritized by management can be an exception.

Digital transformation, however, should not imply an across the board paradigm shift without taking generational differences into consideration. Thus in addition to addressing the needs of those who are willing to convert attention must be paid to those who are reluctant to do so. The views of the older generations less willing or not able to fully adopt such changes must be respected as well.

Thus problems can arise not because of the skeptic attitude of older users but due to the latter being pressured by society or the maintaining organization of their institution to fulfil tasks which they cannot solve. While school libraries and librarians often face this challenge, libraries of higher education institutions and public libraries as well are in a relatively favourable position due to their ability to collectively represent their interests. School libraries, the basic institutions of library pedagogy, however are left on their own. Generally, school libraries do not get enough support from the maintaining organization or the management and even teachers themselves are sometimes reluctant to advocate the cause of the school library.

Naturally, to gain the support of teachers and students as well, high standard services are needed, a concern which is mostly dependent upon the attitude of the maintaining organization and other entities. Is there a way out of this diabolical circle? Certainly there is. In several countries (Finland, Slovenia, U.S.) the school library is functioning optimally and is considered a basic or essential institution of digital transformation in the given organization.

Indeed it is not easy to evaluate a library operating within a “closed system”. At any rate we can conclude that in Hungary the pandemic negatively impacted the school libraries as these places are based on primarily face to face contact and are generally poorly equipped from an informatics standpoint to provide valid help in this situation to the students and workers of the given school.

3.8 Summary, Tasks

Neither the higher education sphere, nor school libraries were prepared to meet the infrastructural, human resource, and service-related requirements of the aforementioned developmental challenges. Moreover, in several cases due to the deficient services school libraries cannot count on the support of their users, the students, and the teachers.

The second part of our research calls for increasing teachers' awareness of the training management systems and the school libraries. Although the following list contains almost self-explanatory and obvious recommendations and suggestions, they have not been fully adopted by the actors of the education arena.

- The malfunctioning of these systems (training management systems and school libraries) does not mean that they cannot function properly.
- The reason for the inability of library staff and experts to support the education process is not the lack of will.
- School libraries are fully dedicated to students, teachers, users, and quality education efforts.

The Task and Responsibilities of Management

- Comprehensive design, the integration of technology into schools.
- The establishment of "bubbles of excellence", the elaboration of a norm system for schools and classes.
- Finding the optimal balance between extracurricular online/e-Learning and traditional classroom-based learning.
- Identifying viable best practices.
- What is needed for each school/class to be able to participate in blended learning and teaching with web-based devices?
- Ways of applying the given technology (options, system limits).
- Can we present a system enabling students to learn the use of technology and the respective devices?
- Providing wide bandwidth use and diverse media based content and universal access for each student according to general and legal requirements.
- Providing open access and transparency between the school, the maintaining organization and the respective post-graduate training schemes.
- Providing secure networks and downloading options (open source code software)
- Operational standards and norms (emphasis on safe systems).
- The use of interoperable systems.
- Processing and use of student provided materials.
- Curricular development and improvement of the information technology according to the abovementioned guidelines.
- Online professional development of teachers, the promotion of digital literacy.
- Cost effective operation (use of university mainlines).
- Constructing student inputs.
- Technology related decisions, strategic design not only at the given venue but at system level, with special attention to integrated technological support.
- Taking student expertise into consideration.
- Coordinating partnership relations.

- Etc. (in part Abram, 2009)

The Task and Responsibilities of the Principal Actors: Students, Teachers, Librarians

While the relation or connection between teachers and the school library is rarely explored and the general emphasis is on student relations, these two factors are closely connected. A teacher who does not point out the existence and options provided by the school library is not likely to use the library himself. (This however, should not be their own fault altogether as previously suggested).

- Is the teacher aware of the benefits of a good training management system or a school library (physical space, documents, digital repository)?
- What can teachers expect from a training management system or a school library? (How much additional effort is required for their use?)
- What can a teacher get from a training management system or a school library?
- Does the teacher use the training management system or the school library consciously or haphazardly?
- How useful is the training management system or school library in the acquisition of necessary information? (i.e., Kaplan, 2010)
- How useful is the training management system or the school library for completing one's education?
- To what extent the training management system or school library helps the use of ICT devices in school and at home?
- Does the school library support the teaching of reading and reading promotion efforts, etc.?

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