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## FUNCTIONALITY OF LOOMEN LMS: CROATIAN EDUCATORS' PERCEPTION AND EXPERIENCE

**Abstract:** Various shifting paradigms dictate the manner in which education systems are established, (re)organized and implemented. The emergence and increase in the popularity of learning management systems (LMSs) represent a noteworthy example of teachers coping with the challenges of change. This study focuses on the Loomen LMS, an open-source, e-learning system in which teachers, together with their students, create and manage strategies, methods and tools to optimize the teaching process. The objective of this research was to evaluate the functionality of the Loomen LMS through the analysis of the perceptions, opinions, impressions, observations and experiences of Croatian educators who have used the platform since its implementation in public schools. This qualitative research analyzes the responses of 181 educators from both primary and secondary levels of education from each of the 21 counties in Croatia. The data were collected through a validated questionnaire survey in an online form. The results indicated that the Loomen LMS was most rarely used for those features for which it was primarily designed, that there was a difference in several aspects of usage between the two levels of education, and that the frequency of usage was not asymmetrically proportional to the amount of educators' overall working experience. The data from this study provide new academic research evidence regarding the Loomen LMS and its need for improvement in several aspects concerning its functionality.

**Keywords:** Croatia, educational system, e-learning, LMS, Loomen

## INTRODUCTION

Education. Noun. Defined as *an act or process of imparting or acquiring general knowledge, developing the powers of reasoning, and preparing oneself or others intellectually for mature life*; or as *an act or process of imparting or acquiring particular knowledge or skills*; or even as *a degree, level, or type of schooling*; or as *the art of teaching* (Definition of education, n.d.). It is a multilayered definition of a multidimensional term.

How is this phenomenon perceived in everyday life? There is a story about a teacher who was stopped in his car by a traffic policeman. The policeman saw how the teacher forgot to turn on his signal indicator, which was a clear traffic violation. As this happened in close proximity to the school, another car slowly passed next to the policeman and the vehicle he stopped. The driver of the car and the passengers were teacher's students who half-jokingly kept yelling, through rolled-down windows, phrases such as *Yeah, you stopped the right man!* and *Make him pay a fine!*. The perplexed policeman asked the teacher whether those were his students. After hearing the teacher's affirmative response, the

policeman disregarded the half-written traffic ticket and said goodbye to the teacher with the words *Don't worry Sir, you are paying your debt to society every day in your classroom.*

The educator<sup>1</sup> from this story is one of the authors of this study, while the policeman can be seen as a reasonable member of human society who knows, perhaps, a different aspect of the term education. Passively, the policeman is aware that the educational process is not static but rather dynamic and full of changes and challenges. There are many parameters that influence and dictate the manner in which global education systems are established, (re)organized and implemented. Such parameters include advancements in technology, new research data, the modernization of society and increased globalization. Therefore, educators must be equipped with a vast array of skills and tools to cope with the challenges of the everyday educational process. From that perspective, the emergence and increase in the popularity of *Learning Management Systems (LMSs)* represent just one example of teachers coping with the aforementioned challenges.

However, is every such tool useful and welcomed into the educational sphere? Are they functional and to what degree? Are they used by educators across all levels of education, and in what manner? This paper aims to answer questions such as these for one specific LMS. Through the scope of the primary and secondary educational system in Croatia, the authors center their study on the *Loomen LMS*, an open-source LMS used by Croatian educators. The rationale for this study is that the Loomen LMS was implemented in public schools in Croatia in 2018 and was considered to be a new and somewhat revolutionary but also obligatory tool for educators in Croatia (Baksa and Luić, 2020; Beroš and Pongračić, 2018). Additionally, studies regarding the Loomen LMS are rare in the academic world – according to inspections through several academic search engines in which the Loomen LMS is a keyword or a word from the title, at the time of this writing, there are zero articles in *WordCat*, *Education Resources and Information Center*, *ScienceDirect*, *Academia*, *Semantic Scholar*, *JSTOR* and *Base*, except for *Google Scholar*, which provides one such result. Therefore, the aim of this paper is to fill this academic void and to provide functionality data about the Loomen LMS, as knowledge about teaching tools is critical for the teaching profession. The data were obtained through a qualitative research study of the responses of 181 educators from both primary and secondary levels of education from all parts of Croatia. The instrument used was a validated questionnaire made specifically for this research by the authors. The statements covered a range of experiences, perceptions, understandings and opinions by the educators about the Loomen LMS, whose subsequent assessment led to the disproof of all three hypotheses of this paper. These results show that the functionality of the Loomen LMS needs improvement in multiple aspects.

This paper is organized as follows: section 2 depicts the theoretical framework by (a) examining the definition, terminology, historical overview and types of LMSs and presenting related academic research, as well as (b) describing relevant features of comprehensive curricular reform in Croatia called the *School for Life* and its component Loomen LMS; section 3 details the methodology of the study; section 4 displays the results; and sections 5 and 6 complete the paper with a discussion of the data and a conclusion.

## THEORETICAL FRAMEWORK

### Learning management systems

In general, any number of learning management systems can be defined as types of software and/or web-based technologies that operate on a twofold basis - *servers* that function as a foundation of the programs and *interfaces* that are operated by the individuals who use these programs (Alias and Zainuddin, 2005). Although there are a number of different LMSs, they all offer a vast range of possibilities to users regarding learning, teaching and education. Thus, LMSs allow educators to manage every aspect of e-learning. Educators can create and design curriculum and syllabus plans, monitor attendance and evaluate and assess students' progress. In addition, educators, together with their students, can store and share content and materials, participate in threaded discussions and use various

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<sup>1</sup> The term *educator* is referred, by the authors, to the individuals from the educational sphere who are a part of the educational process in various aspects and levels of schooling; such as, but not limited to, teachers, professors, lecturers, pedagogues, school psychologists, mentors, instructors and tutors. The term also refers to both sexes and all gender identifications.

communicational tools and forums for the optimization of the educational process (Zelinskiy, 2020). Additionally, LMSs provide set courses, tasks and individual training programs for the educators themselves.

Terminologically speaking, due to its framework that allows handling all aspects of the educational process, LMSs can also be labeled *Course Management Systems (CMS)*, *Learning Content Management Systems (LCMS)*, *Reusable Learning Objects (RLO)* and *Virtual Learning Systems (VLS)* (Alias and Zainuddin, 2005; Cavus, 2015; Lonn and Teasley, 2009; Wright et al., 2014). However, Watson and Watson (2007) believe that LMSs do not limit their functionality as CMSs, LCMSs and RLOs do and that even though they possess many similar features, the aforementioned systems should actually be regarded as being a part of LMSs. They argue that the RLO represents the smallest form of content, which is created and handled within the LCMS and subsequently organized and segmented into particular courses within the CMS. Therefore, the abovementioned elements serve as an infrastructure for the completed LMS (Watson and Watson, 2007). In addition, Paulsen (2003) labeled LMSs as *Virtual Learning Environments (VLE)* or, simply, *Learning Platforms (LP)* that are used for the management of the educational process.

From a historical standpoint, LMSs started developing due to massive technological advancements that began in the 1990s. Most of these systems became commercialized after being originally created as university concepts—they were not initially created as business ventures. However, through various technical developments, many LMSs were subsequently released under open source rather than commercialized licenses. Ever since then, there has been a rapid worldwide increase in the use of and, therefore, in perfecting LMSs. According to Coates, James and Baldwin (2005), LMSs became, through constant usage, scalable systems that can be used as additional means of education or function as a basis for an entirely independent educational course or training program. Furthermore, Paulsen (2003) attributes the majority of the success of LMSs to their availability and accessibility.

All of the above led to the creation of the three main types of LMSs: *proprietary*, *cloud-based* and *open-source* (Dobre, 2015). Proprietary LMSs revolve around earning profits and are licensed products developed by professional programmers (Ghilay, 2019). In most cases, they require licensing fees with additional expenses concerning subscription and maintenance. Examples of proprietary LMSs are *Blackboard*, *Litmos*, *eCollege*, *Saba*, *D2L* and *Topyx*. Cloud-based LMSs represent the easiest and simplest type of LMS option due to the lack of need for installment of the software or hardware required to use them. Users log into a web-based platform that encompasses a plethora of tools used for activities such as document sharing, file storage, collaboration, communication and video and photo sharing (Ghilay, 2019). Examples of cloud-based LMSs include *Coassembly*, *Graphy*, *Absorb LMS*, *Talent LMS*, *ISpringLearn LMS* and the *Google Account System*. Finally, open-source LMSs denote a program whose source code, as the name itself suggests, is made available for free usage and modification in any form that users see fit. This is the primary reason why open-source LMSs are becoming increasingly prevalent compared to other types of LMSs (Berking and Gallagher, 2016). Examples of open-source LMSs include the *Moodle*, *Sakai LMS*, *Forma LMS*, *ELMS Learning Network*, *Sensei LMS* and *Canvas LMS*. Another example of an open-source LMS is the LMS, which is the focus of this study—the *Loomen LMS*.

The Loomen LMS is based on, arguably, the most popular LMS in usage, Moodle. Moodle is a *single robust, secure and integrated system* for the creation of learning environments. Created in 2002, it has been developed through the principles of social constructionist pedagogy. Like Loomen LMS, it is designed to help both teaching and learning. Moodle is free and easy to use, and available in more than 120 languages. Both the Moodle and Loomen LMSs are highly customizable and flexible due to their open-source code. They share a variety of built-in tools, courses and features such as chats, forums, dictionaries, quizzes and individual training programs (Guri-Rosenblit, 2018; Nedeva, 2005; Vaganova et al., 2020). The official guidebook created by the *Croatian Academic and Research Network* (2019:4) defines the Loomen LMS as a *software tool for creating e-courses, distance education and combining virtual and traditional educational processes*. Additionally, CARNET (2019) states that it provides support in attending ready-made e-courses through virtual classrooms as well as using off-the-rack educational materials; in creating courses in its entirety; in combining distance education with traditional teaching; and, last, in contacting administrators by providing an e-mail address.

With this in mind, the benefits of implementing any kind of technology in the education process are undeniable and have been the object of extensive studies and research over the past two decades, as

paper textbooks, workbooks and notebooks, blackboards and projectors, chalks and handouts are no longer the only means for education (Eady and Lockyer, 2013; Ferdig, 2006; Khoshimova et al., 2020; Kraleva et al., 2019; Sife et al., 2007). In one of the first studies on this topic, Ehlers (2004) concludes, after assessing 30 aspects of e-learning (he labels them as dimensions), that the success of such platforms lies in the orientation toward the individual needs of each learner and every learner. Correspondingly, the emergence and development of LMSs provide new opportunities for educators as well as students and make the educational process less limited by the boundaries of traditional learning and teaching methods. LMSs offer a broad spectrum of possibilities that are adaptable to the needs and preferences of an individual learner (Capper, 2001; Grönlund and Islam, 2010; Harandi, 2015; Huda et al., 2018; Le and Do, 2019). In their respective studies, Liaw (2008) and Basak (2018) surmised that educators should take advantage of the benefits that LMSs provide, as they contribute to the overall effectiveness of learning and the optimization of the education process.

Moreover, educators' attitudes toward LMSs can play a significant role in increasing their effectiveness. In his study, Hoq (2020) concludes that the majority of educators have a positive stance toward LMSs, as they believe it saves time and energy and modernizes the educational process. On the other hand, Kar's (2020) research findings show an unsatisfactory outlook on the use of LMSs by educators. He attributed this to educators' lack of technological knowledge and experience when working with LMSs. A confirmatory study was conducted by Berbar (2020), who reported that educators have negative perceptions of LMSs due to the absence of training courses and face-to-face communication with students.

It is evident that the effectiveness of LMSs is dependent upon the technological knowledge and digital literacy of educators. Numerous studies have identified new skill sets that must be mastered by educators (Alexander et al., 2017; Bates and Sangra, 2011; Benson and Brack, 2009; Ubachs et al., 2017). These include but are not limited to skills for designing curricula, using additional tools (surveys, quizzes, dictionaries, etc.), uploading and downloading educational materials, creating subgroups, implementing lesson objectives, monitoring progress, testing and grading (Guri-Rosenblit, 2018; Wilson et al., 2004). Li and Yu (2022) state that the digital literacy of educators must be considered indispensable because it will be completely integrated into the conventional education process *in the long run*. Therefore, educators must be properly educated to learn effectively through LMSs.

### Comprehensive curricular reform *school for life*<sup>2</sup>

The Loomen LMS came to fruition as a part of the *Comprehensive Curricular Reform (CCR)* in the Republic of Croatia. The name of the reform was *School for Life*, as it symbolized the preparation of students for later life as well as the need for continuous education. It was the most comprehensive reform ever attempted in Croatian history<sup>3</sup>. It began experimentally in 74 schools in Croatia (48 primary and 26 secondary schools) in the 2018/2019 school year and subsequently expanded to all other schools in the country (CARNET, 2020).

The basic ideology of the reform included changing educational paradigms such as making students the focal point of educational processes and providing more freedom and autonomy to educators (Bušljeta and Kardum, 2019); improving the technical and technological aspects of education institutions (CARNET, 2020); and subsequently increasing the extent of employability, as well as the international competitiveness and expertise of the Croatian people (Beroš and Pongračić, 2018). According to the summary report of monitoring and evaluation findings of the CCR in Croatia, there were four major themes in the focus of the reform: learning outcomes, problem solving, learning to learn and coaching (Curriculum Reform in Croatia, n.d.). It is noticeable that there are no signs of the actual name of the CCR mentioned in this report—in the entire document, which is quite extensive and detailed—the name of the CCR *School for Life* is referred to only as *our project* by the hired panel of international experts. The CCR *School for Life* encountered various problems and difficulties, with Beroš and Pongračić (2018) emphasizing the generally dire atmosphere surrounding the CCR and describing it as threatening instead of stimulating. It is also quite suggestive that the most recent

<sup>2</sup> Croatian language: *Škola za život*

<sup>3</sup> Since gaining its independency in 1991, Croatia has faced its educational system against several comprehensive curricular reforms with varying degrees of success and impact. The majority of these reforms were greatly politicized.

post/news article published on the official website of the reform is, at the time of this study, almost three years old.

Nevertheless, as stated earlier, the CCR School for Life was implemented in the Croatian educational system, as was the Loomen LMS. Moreover, the Loomen LMS represented the most prominent aspect of the reform, as it was the primary tool for improving the technical and technological elements of the education system, which was one of the focal points of the CCR.

## METHODOLOGY

### Research aim and hypotheses

The aim of this empirical research is to fill the academic void and to provide functionality data about Loomen LMS through the analysis of the perceptions, opinions, impressions, observations and experiences of Croatian educators who have used the platform since its implementation to public schools in 2018.

Based on the research aim, the following hypotheses are formed:

- H1:** *The Loomen LMS possesses high functionality as it is used for the very purpose for which it was designed.*
- H2:** *There is no significant difference in the usage of the Loomen LMS between primary and secondary levels of education.*
- H3:** *The usage of the Loomen LMS is asymmetrically proportional to the length of the working experience of the educator.*

### Instrument

The instrument used in this cross-sectional study is a multidimensional questionnaire that consists of two parts, with the second part having two variations. No standardized instruments were implemented, as none corresponded to the authors' needs or intended purposes. Therefore, the questionnaire was developed and validated specifically for this study by a panel of experts.<sup>4</sup> It is concluded that the ambiguity of the measurement item is eliminated, that the face validity is established, that the questionnaire measures what the respondents know, with a highly reliable scale used and that all fronts of the case variables are covered with high intercorrelational reliability. Additionally, the high internal consistency of the items within the scale was confirmed by a Cronbach's alpha coefficient of  $\alpha=0.92$ .

The first part of the questionnaire contains sociodemographic variables that are based on seven questions about the features of the participants. The second part contains case study statements and has variations A and B. They are segregated by the distinctive question whose answer further directs the participants. Variation A is for the participants who answer positively on the distinctive question and is composed of 23 statements and one question. Variation B is for the participants who answer negatively on the distinctive question and comprises only one question. The complete structure of the questionnaire is illustrated in Table 1. This type of multiple questionnaire structure allows the authors to assess both sides of the spectrum of the functionality of the Loomen LMS.

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<sup>4</sup> Panel includes distinguished members of educational sphere with more than a decade of teaching experience per member and across 8 educational areas of expertise.

**Table 1**

*Structure of the Questionnaire on the Functionality of the Loomen LMS in Croatia*

| <b>sociodemographic variables</b>                                                                                                                                                          | <b>case study variables</b>                                                                                                                |                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| 7 questions about participants' gender, age, level of education, type of the educational institution, county of workplace, educational area of expertise and length of employment service. | distinctive question:<br><i>Have you ever used Loomen LMS?</i>                                                                             |                                                                |
|                                                                                                                                                                                            | A (yes)                                                                                                                                    | B (no)                                                         |
|                                                                                                                                                                                            | 23 statements on a 5 point Likert scale + 1 open-ended question<br>(What are your thoughts, perceptions and experiences about Loomen LMS?) | 1 open-ended question<br>(Why have you never used Loomen LMS?) |

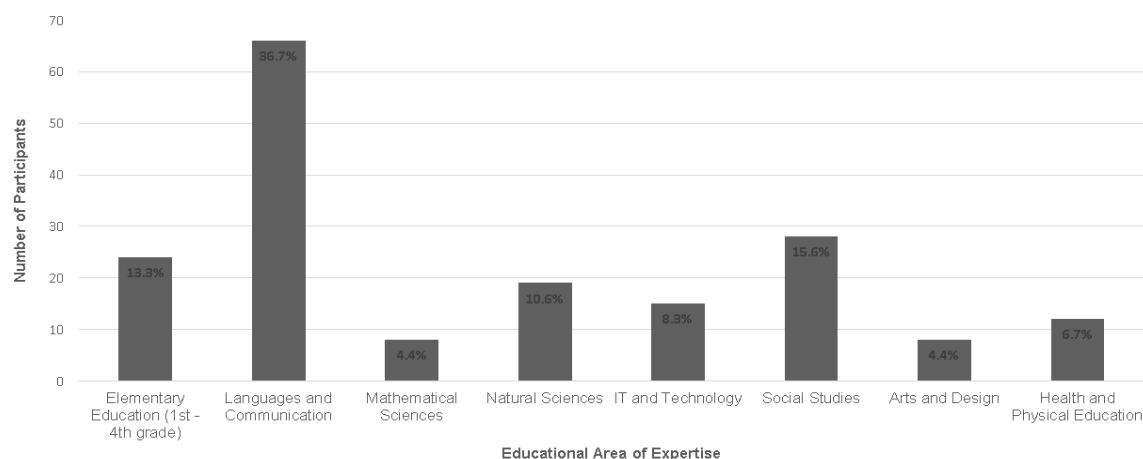
*Note.* Variation A contains 23 statements in which educators specify their level of agreement on a five-point Likert scale ranging from *rarely* to *very often*.

### Participants

The research was conducted with 181 participants who generated 181 valid responses. The participants were educators from primary (N=102, 56.3%) and secondary (N=79, 43.7%) levels of education, with the majority being female (N= 158, 88.3%). Additionally, a significant majority (N=167, 92.3%) of the participants had an educational EQF level 7 degrees<sup>5</sup>. The length of employment service of the participants is equitably distributed throughout the spectrum, and each of the 21 counties in Croatia is proportionally represented. Figure 1 shows the data concerning the participants' educational area of expertise.

**Figure 1**

*Educational Area of Expertise of the Participants*



### Procedure

The research was conducted in the winter of 2022. The questionnaire was uploaded online, and responses from educators were collected via the *Google Forms* survey tool. All participants were informed about the aims and purposes of the research, and the anonymity of the respondents was guaranteed. All aspects of the Code of Ethics in Academic Research (2021) were honored. The results were analyzed using *IBM SPSS Statistics* software with descriptive statistics, categorization and

<sup>5</sup> European Qualifications Framework – Level 7 includes all educational degrees that are equivalent to a Master's degree.

comparison used for testing H1; the Kolmogorov–Smirnov test and Mann–Whitney U test used for testing H2; and the chi–squared test used for testing H3.

## RESULTS

### FUNCTIONALITY OF THE LOOMEN LMS: VARIATION A - STATEMENTS

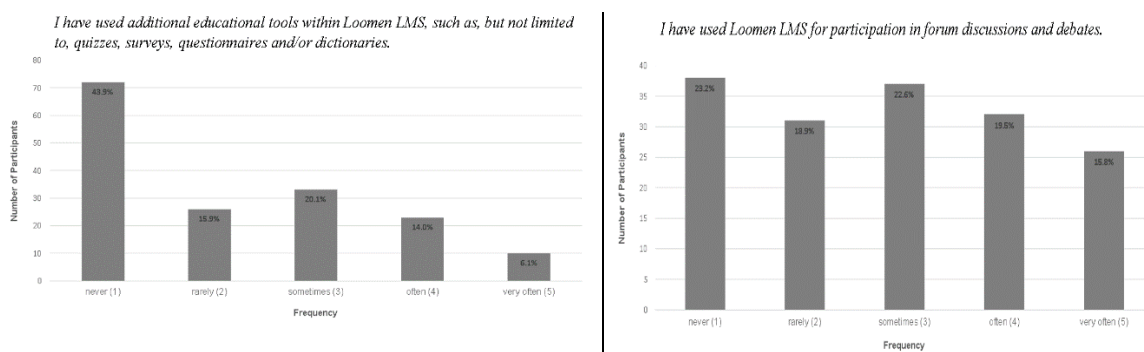
A total of 90.6% (N=164) of the participants answered the distinctive question positively and therefore used the Loomen LMS to some degree and with some degree of variation. The obtained data are observed from three angles—the data that are predominantly oriented at either of the two sides of the spectrum of the Likert scale and the data that are represented somewhat equally throughout the spectrum.

Thus, 72% (N=116) of the participants never used the Loomen LMS at school for real-time learning processes<sup>6</sup> (QN4), while 54.9% (N=90) of them never used the system for any-time learning processes<sup>7</sup> (QN5). Next, 71.2% (N=116) of the participants never used the Loomen LMS as a grading tool for students' knowledge (QN16), and 69.3% (N=113) of them never used the Loomen LMS as an assessment tool for tracking students' educational progress (QN15). Fifth, 69.9% (N=114) of the participants admitted to never using the Loomen LMS for virtual teaching (QN3). Additionally, 68.3% (N=112) of the participants never used the aforementioned system as a tool for informing students about news related to the educational process (QN18), as a system for sharing educational materials with students (64.4%, N=105, QN17), or as a communicational tool whatsoever (67.3%, N=109, QN14). Finally, 58% (N=94) of the participants stated that they never used the Loomen LMS to create their own educational curriculum or syllabus (QN1) and denied still using the Loomen LMS for any aspect of the educational process at the time of their participation in this study (62.2%, N=102, QN23).

On the other end of the spectrum, 42.7% (N=70) of the participants claimed that they used the Loomen LMS very often for attending built-in e-courses for the purpose of individual professional improvement (QN7). Furthermore, 40.4% (N=65) of them used the system very often for working and completing various educational tasks set by system administrators (QN10). The remainder of the data are represented somewhat equally throughout the spectrum, with Figure 2 denoting the most relevant data.

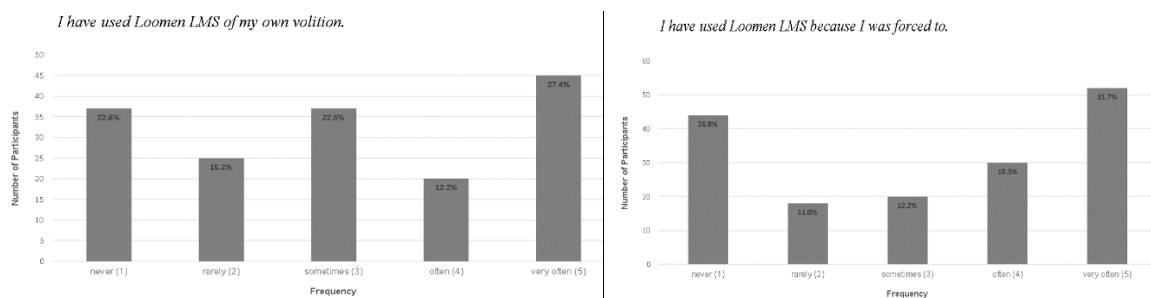
**Figure 2**

*Functionality of the Loomen LMS - Relevant Statements*



<sup>6</sup> Real-time learning process denotes a synchronous instruction, a process of acquiring knowledge at the same place and at the same time by the educators and their students (Finkelstein, 2006).

<sup>7</sup> Any-time learning process denotes an asynchronous instruction, a process of acquiring knowledge by the students at their own pace and at their own place, within the defined limits set by the educators (Finkelstein, 2006).



Note. Denoting questions 2, 11, 21 and 22.

## FUNCTIONALITY OF THE LOOMEN LMS: VARIATION A - OPEN-ENDED QUESTIONS

Of the 90.6% (N=164) of the participants who answered the distinctive question positively, 76.2% (N=125) gave a valid response to the open question at the end—*What are your thoughts, perceptions and experiences about the Loomen LMS?* Table 2 shows the categorization of the responses.

**Table 2**

*Functionality of the Loomen LMS - Categorization of Educators' Responses A*

| General thoughts, perceptions and opinions | Percentage (%) | Number of participants (N) |
|--------------------------------------------|----------------|----------------------------|
| (generally) positive                       | 40             | 50                         |
| neutral                                    | 4              | 5                          |
| (generally) negative                       | 56             | 70                         |

It is noticeable that positive responses are not as detailed, elaborate, thorough and notably intense in nature as negative responses are. Positive answers are significantly shorter, often indicating that the system is satisfactory or describing it with a short simple sentence. For example, several participants modestly wrote adjectives such as *good*, *very good*, *excellent*, *(mostly) positive*, *useful*, *just fine*, *powerful*, *respectable* and *not bad*. One participant wrote that the Loomen LMS is *an excellent system with useful materials available*; the other stated that *it is a useful tool with many possibilities*. Furthermore, one participant wrote that *it is an excellent system that can function as an addition to the traditional way of teaching or act as an independent e-learning system*, adding that all of his teaching materials are in the Loomen LMS and that *CARNET's support is fast and efficient*. Another participant praised the support of the administrators, saying that *the system is great for both the teachers and the students, as all of the tools are available inside one platform*. One participant stated that the system contained useful materials for state qualification exams in teaching.

In terms of purpose, there are two dominant aspects of usage that subsequently differ among participants. Participants stated that the Loomen LMS was adequate for the purpose of individual professional improvement because of practicality in time and place management. However, for the purpose of virtual teaching, the participants deemed it inadequate due to its complex, unclear and unfriendly interface. This was the answer of one of the educators who noted that the *Loomen LMS is excellent for professional development, but for virtual learning, there are far better systems such as Teams or the Google Classroom*; the other stated that *she is satisfied with built-in e-courses and ready-made programs for self-improvement*, while the third said that *it is a respectable platform but not really useable for e-learning*.

Educators formed a fairly unified opinion that the use of the Loomen LMS was more appropriate for older students. Therefore, one participant expressed that *the system is designed in an interesting way, but there are simpler and more attractive platforms for working with younger students*; the second noted that *it is not a bad platform for high school and college students, but for elementary school students, MS Teams is easier and clearer*; and the third summarized that *even though it contains many possibilities for the usage in teaching... it is too complicated for elementary school students to use without teachers' guidance*.



A lot of remarks were directed towards the structure and interface of the system. It was labeled complex, visually uninteresting, insufficiently interactive, impractical, nonfunctional and not user friendly. Thus, one educator commented that the system has an *unintuitive interface* and that he *cannot find a single advantage of the Loomen LMS over similar platforms*. Another participant wrote that *the Loomen LMS has its advantages and that the courses are useful and well presented, but in general, as a platform, it is confusing and not user friendly enough*.

Additionally, it was evident from the participants' responses that the encompassed negativity toward the Loomen LMS was rooted in the manner in which this system was implemented in schools. Many of the responses emphasized that educators felt pressured into using the system. Therefore, one participant noted that as she was *literally forced into using the platform*, she felt an *aversion toward it and would not use the platform at all*. Another participant responded that *forced education is never a good thing, especially when it also has time limitations and deadlines*. One participant stated that he would never use the system if it was not mandatory. Several participants wrote about the pointlessness of obligatory tasks for educators and emphasized the meaninglessness of the badges that were awarded upon successful completion of the aforementioned tasks. One participant concluded that the Loomen LMS was mostly used because it was forced by the *Ministry of Education and Science* and that after the change in ministry officials, *nobody later even heard of the Loomen LMS*.

Entirely negative responses were submitted and varied in length and detail from one word to several sentences. Thus, participants described the Loomen LMS as a *bad, pointless, utter failure, perplexing, disaster and nonsense*. Several participants stated that *it is a complete waste of time and money*; another participant argued that the Loomen LMS represented *a humiliation of the teaching profession and therefore a degradation that we should not have allowed to happen to ourselves*. One participant stated that *the system is nonsense that robs teachers of the valuable time that they should spend working with students instead and not be connected to any brainwashing platforms*, while another said that *the system has little to no practicality in the education process and was, instead, an element for greasing the wheels of bureaucracy*.

#### FUNCTIONALITY OF THE LOOMEN LMS: VARIATION B - OPEN-ENDED QUESTION

Variation B of the questionnaire consists of the remaining 9.4% (N=17) of the participants who answered negatively on the distinctive question. There are 16 valid responses to the open-ended question *Why have you never used Loomen LMS?*. The categorization of the responses is shown in Table 3.

**Table 3**

*Functionality of the Loomen LMS - Categorization of Educators' Responses B*

| Reasoning for not using<br>Loomen LMS | Percentage<br>(%) | Number of participants<br>(N) |
|---------------------------------------|-------------------|-------------------------------|
| Lack of need                          | 25                | 4                             |
| Lack of opportunity                   | 18.7              | 3                             |
| Ignorance                             | 12.5              | 2                             |
| Ineffectiveness of the system         | 12.5              | 2                             |
| Not specified                         | 31.3              | 5                             |

The noteworthy response includes a female participant who stated that she did not use Loomen LMS deliberately because, due to her 40 years of work experience, combined with the status of an advisory teacher, she did not want to spend time on *useless typing*.

#### USAGE OF LOOMEN LMS: PRIMARY VS SECONDARY LEVEL OF EDUCATION

The Kolmogorov–Smirnov test of the equality of continuous probability distributions revealed that there was no normal distribution of the data. This was to be expected due to the sample size in combination with the use of a five-point Likert scale. Therefore, the Mann–Whitney U test was used for further analysis. Table 4 illustrates the points of discrepancy in the usage of the Loomen LMS between primary- and secondary-level educators.

**Table 4**

*Primary vs Secondary Level Educators - Usage Disparity*

| QN  | Statement                                                                                                                                      | Educational level | M    | SD   | C    | IKR  | R    | M-W          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|------|------|------|------|--------------|
| 23. | I still use Loomen LMS for any aspect of the educational process, irrelevant of whether it was mentioned or not in this questionnaire.         | primary level     | 1.72 | 1.24 | 1.00 | 1.00 | 4.00 | <b>0.049</b> |
|     |                                                                                                                                                | secondary level   | 2.18 | 1.54 | 1.00 | 2.00 | 4.00 |              |
| 2.  | I have used additional educational tools within Loomen LMS, such as, but not limited to, quizzes, surveys, questionnaires and/or dictionaries. | primary level     | 2.04 | 1.25 | 1.00 | 2.00 | 4.00 | <b>0.031</b> |
|     |                                                                                                                                                | secondary level   | 2.49 | 1.35 | 2.00 | 2.00 | 4.00 |              |
| 3.  | I have used Loomen LMS for virtual/online teaching.                                                                                            | primary level     | 1.64 | 1.23 | 1.00 | 0.00 | 4.00 | <b>0.030</b> |
|     |                                                                                                                                                | secondary level   | 2.12 | 1.59 | 1.00 | 3.00 | 4.00 |              |
| 7.  | I have used Loomen LMS for attending built-in e-courses for the purpose of individual professional improvement.                                | primary level     | 4.03 | 1.26 | 5.00 | 2.00 | 4.00 | <b>0.012</b> |
|     |                                                                                                                                                | secondary level   | 3.62 | 1.29 | 4.00 | 2.00 | 4.00 |              |

There were statistically significant differences in four aspects when comparing the data of the participants who worked at the primary level of education versus those who worked at secondary levels of education. It is evident that secondary-level educators used the Loomen LMS more frequently in three aspects related to overall usage frequency, more frequent usage of built-in tools and virtual teaching. In contrast, primary-level educators used the Loomen LMS more frequently for one aspect of attending courses for the development of their professional skills.

#### USAGE OF LOOMEN LMS AND LENGTH OF WORKING EXPERIENCE

The chi-squared test was used to compare the observed data with the expected data. The test revealed that those educators who had the shortest length of working experience used the Loomen LMS less frequently than was projected. Namely, educators who had less than five years of working experience used the Loomen LMS less frequently than expected ( $\chi^2(7) = 15.497$ ,  $p = 0.03$ ,  $p < 0.05$ ). The data of every other group are inside of the expected data margins.

#### DISCUSSION

This study tested the functionality of the Loomen LMS, as H1 proposed that the Loomen LMS is highly used for the very purposes it was created. According to the definition of its creator, CARNET (2019), this means that educators design their own educational curriculum and syllabus, combine virtual and traditional educational processes, use additional educational tools within the system, and create and attend e-courses. The results of this study show negative usage of three out of these four focal aspects.

In a comparison study between various LMSs, Al-Ajlan and Zedan (2008) concluded that the effective creation of their own curriculum was one of the points at which educators deemed the Moodle platform superior to other LMSs, while Umek et al. (2015) concluded that educators who created their own curriculum courses inside LMSs obtained better results when assessing the overall knowledge of their students. In contrast, 58% of educators never used the Loomen LMS to create their own

educational curriculum or syllabus. Next, Al Yafaei and Attamimi (2019) observed that the educational process was optimal if it had a virtual component implemented in a traditional way of teaching. Nonetheless, the Loomen LMS was never used for virtual teaching by 69.9% of the educators. In addition, Muhsen et al. (2013) emphasized the advantages of using additional educational tools within LMSs and their positive effects on the educational process. However, 43.9% of educators never used additional educational tools within the Loomen LMS. The only point where the Loomen LMS showed a high level of functionality was the attendance of e-courses with the purpose of professional development by educators, 42.7% of which were frequently used.

Continuing the discussion outside of four focal aspects, the Loomen LMS offers a wide range of educational possibilities, denoting both features within the program and their application. However, the majority of the data indicate that the tool is not used as intended by the creator. For example, 71.2% of educators never used Loomen for the assessment of students' knowledge, 69.3% never used it for tracking students' progress, 68.3% never used it as an informational tool or as a communicational tool for 67.3% of them, and 64.4% of educators never used the Loomen LMS for uploading the educational materials intended for students. This is unfortunate, as there are many studies that imply high functionality and indicate frequent usage of these aspects as great facilitators of the educational process (Ivanović et al., 2013; Nedeva, 2005; Vaganova, 2020; Zelinskiy, 2020).

Finally, when assessing the functionality of the Loomen LMS from the perspective of educators' thoughts, perceptions and experiences, it is evident that the Loomen LMS induces conflicting opinions from educators, as their responses can be found on both ends of the data spectrum. Nevertheless, the majority are negative in nature and have a number of flaws and deficiencies. They are significantly more intricate, detailed and elaborate than the positive ones, which simply indicates that the Loomen LMS is adequate for describing advantages and strengths in a brief manner. Additionally, even neutral responses tend to have a negative curve.

Continuing to H2, the study proposes that there are no significant differences in the usage of the Loomen LMS between primary and secondary levels of education. The logic behind this hypothesis is that the system was implemented through CCR at both levels of education equally, with no differences or variations. However, the data show user disparity in four aspects of usage between the two levels of education. Three aspects of usage are in favor of secondary-level educators who, on average, used the Loomen LMS more frequently, used tools built within the system more often, and used them for virtual teaching to a greater extent. The fourth aspect is in favor of primary-level educators who used it slightly more frequently for attending built-in e-courses for the purpose of individual professional improvement. These data are coherent and juxtapose with the educators' thoughts, perceptions and experiences that the Loomen LMS is perhaps more adequate for working with older students. This is relevant to several studies that illustrate how older students possess greater technical and digital literacy and are, therefore, more prepared for efficient usage of LMSs (Dahal, 2019; Lopes, 2011; Rodrigues et al., 2017).

Finally, within H3, the authors propose that when the level of working experience of the educator increases, the frequency of usage of the system declines. This is rooted in the fact that those educators with the least experience will need the most support from the educational system as compensation for their inexperience. Additionally, they tend to be younger and more agreeable to changes, with higher levels of digital literacy. Rößling et al. (2010) concluded that longer working experience correlated with higher levels of negative attitudes toward LMSs. However, the data show the opposite, as those educators with the least working experience tended to use the Loomen LMS less frequently than expected.

## CONCLUSION

In conclusion, it is irrefutable to the authors that their H1 must be disproved, as the data show that the Loomen LMS does not possess high functionality. In other words, it is not used for the intended purposes for which it was designed. The reasons for this are debatable and may represent a strong basis for further research. The authors' H2 is also rebutted as there are significant differences in the usage of the Loomen LMS between primary and secondary levels of education. The rebuttal of this hypothesis is, arguably, the least surprising to the authors, as the Loomen LMS follows the data framework of other LMSs where similarly, their function when working with younger students is not as optimal as when working with older students. Establishing levels of optimization of the Loomen LMS can be a point for future research. Finally, the authors' H3 is also refuted, as educators with the least working experience used the system less than they projected. The reasons for this are questionable. The authors debate that this could be connected to their university studies patterns and routines or to the general overwhelmingness of the changing situation where students become educators. In any case, this may be another direction of interest for future studies. With all three hypotheses disproved, it is evident that the Loomen LMS is in need of improvement in several aspects, as Croatian educators are not entirely satisfied with it.

Limitations of this study can be found in the number of participants. To obtain more generalizable results, further research is needed with the purpose of gathering data from a larger number of participants. Additionally, this study does not incorporate the thoughts, perceptions and experiences of the students who used the Loomen LMS. Their input would be indispensable because it would complete the notion of functionality of the Loomen LMS.

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