

FULFILLMENT OF THE ICDL STANDARD IN THE FIELD OF WEB PAGE EDITING AMONG STUDENTS OF THE FACULTY OF PHILOSOPHY IN NOVI SAD

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Abstract: The inevitability of the Internet in private, business and academic life requires the necessity of knowing the basic terms and technologies on which the functioning of the global computer network relies, together with the principles and tools for editing web pages. In this paper, we examined the success of students at the Faculty of Philosophy in Novi Sad (Serbia) in meeting the international ICDL standard based on their results in the midterm and final exams of the elective course *Introduction to Web Design* during the academic years from 2016/17 to 2023/24. The average percentage of students who met all the requirements for obtaining the corresponding ICDL certificate was approximately 55%, with a slight downward trend and a noticeable negative impact on student achievements at midterm exams during the COVID-19 pandemic.

Key words: computer literacy, web page editing, ICDL, students, higher education, COVID-19

1. INTRODUCTION

In a time marked by rapid technological progress and the widespread shift to digital platforms, computer and digital literacy have emerged as crucial competencies for students in every discipline. As society grows more dependent on digital technologies for communication, accessing information, and addressing challenges, the ability to adeptly use these tools has become vital for achieving academic excellence, advancing in professional careers, and fostering personal growth [1], [2].

While some argue that the current generation, raised in the Digital Age, naturally develops computer and information literacy skills as an inherent part of their growth, the idea that these "digital natives" effortlessly absorb such knowledge without formal instruction is not substantiated [3]. Furthermore, studies highlight the importance of structured teaching in digital literacy to help students build their digital skills and empower them to navigate the digital world with confidence and competence [4]. Although students may be skilled in using smartphones and social media, many lack a thorough understanding and the necessary abilities to effectively navigate the more complex aspects of digital tools and technologies [5]. Moreover, there are indications that students' understanding of basic computer and internet concepts is marked by a lack of structure, gaps in knowledge, and significant inconsistencies, indicating an uneven adopting of fundamental concepts in this area [6], [7].

To address the need for a standardized and widely recognized computer education for employees across the European Union, the ECDL (European Computer Driving Licence) Foundation was established in 1997, with the initiative coming from CEPIS (Council of European Professional Informatics Societies) [8]. In a short span of time, the ECDL gained popularity beyond the EU, and by 2019, it was rebranded as ICDL (International Computer Driving Licence), now recognized in 150 countries and offered in 40 languages globally [9]. This certification is internationally acknowledged as a qualification that verifies essential computer skills. The ICDL was designed to ensure that individuals possess the necessary abilities to operate a computer and use common software applications with confidence. The

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certification covers key areas such as word processing, spreadsheets, databases, presentations, and information and communication technology (ICT) [8], [9].

The ICDL holds significant value in higher education, as it provides a standardized and globally recognized certification for digital literacy. It boosts students' employability, aligns them with industry benchmarks, and ensures that graduates are equipped to meet the digital challenges both in academic settings and in the professional world. ICDL training has had a significant positive impact on the younger generation, enhancing their ICT skills and contributing to their academic success and future career readiness [10]. Even with minimal prior exposure to computers, participants' skills improved dramatically after completing the training, with notable progress in online and spreadsheet skills (a 90% increase), and computer and word processing essentials (a 50% increase).

In an effort to assess and monitor the success of students at the Faculty of Philosophy, University of Novi Sad (Serbia) in meeting ICDL standards through the passing of midterms and exams in relevant subjects, in our previous studies we examined their results within two basic courses: *Computer Literacy* [11] and *Free Software Tools* [12]. As a continuation, this paper focuses on reviewing the performance of students in the subject *Introduction to Web Design*, which corresponds to the ICDL module *Web Editing*.

2. RESEARCH OBJECTIVES AND RESULTS

This paper examines the success of students of the Faculty of Philosophy of the University of Novi Sad in meeting the requirements for obtaining the corresponding international ICDL certificate by attending the elective course *Introduction to Web Design* in the period between the academic year 2016/17 and 2023/24.

The course *Introduction to Web Design* was incorporated into the curriculum of the study programs at the Faculty of Philosophy after aligning of the content of existing computer literacy courses with the international ICDL standard in the 2015/2016 academic year [13], thereby opening the possibility of obtaining the corresponding certificate by passing the midterm and final exams of the mentioned course. In order for the achieved results to be recognized as an exam from the ICDL module *Web Editing*, students must achieve at least 75% success in the exams. Specifically, this means that the exam must be passed with a grade no lower than 8, at least 15 points (out of a maximum of 20) must be earned for each task in the midterm exams, and at least 30 points (out of a total of 40) must be achieved on the final test. In this paper, we analyzed the percentage of students who met the criteria of the ICDL standard in the period between the academic years 2016/17 and 2023/24.

The assessment of students' knowledge as part of their pre-exam obligations was conducted through two midterm exams. The first midterm exam included two tasks: the first was about creating a simple website using HTML, and the second was about formatting that site using Cascading Style Sheets (CSS). While working on these tasks, students were allowed to rely on the pages of the W3Schools website (<https://www.w3schools.com>). The second midterm tested students' knowledge of creating websites using the WordPress (WP) content management system (CMS). Both the midterms and the final test were done on computers in the computer classroom. Students had 90 minutes to complete the midterms, and 120 minutes to complete the final test. The final test covered the entire syllabus and contained 60 closed-ended questions, with 4 possible answers. During the final test, practical testing of alternative answers was allowed (by creating simple web pages using HTML and CSS and the WP system).

Table 1 shows the number of students who took individual tasks in the midterms and the final test by year. For example, in the academic year 2016/17, the total number of students who took the elective course *Introduction to Web Design* was 43 (Total). The number of students who completed the first (HTML) and second task (CSS) of the first midterm was 26, and 25 students completed the task of the second midterm (WP). The final test was done by 25 of them (Test), the grade was recorded in the case of 24 students (Grade, ECDL), and one student was not satisfied with the results.

Table 1 - Number of students who took the given midterm or final exam

	HTML	CSS	WP	Test	Grade	ICDL	Total
2016	26	26	25	25	24	24	43
2017	24	24	24	24	24	24	32
2018	26	26	23	23	23	23	39
2019	22	22	20	20	20	20	35
2020	60	60	54	52	52	52	101
2021	55	55	51	50	50	50	89
2022	20	20	19	19	19	19	44
2023	22	22	20	19	19	19	45

A summary of the results in the form of average performance (AVG) and standard deviation (STD) of percentages of students in meeting the ICDL criteria in the considered period is given in Table 2. In terms of practical tasks, students were most successful in creating websites using the WordPress system (94.1%) and least successful in applying Cascading Style Sheets for web page design (83.6%). Among all considered categories, the standard deviation was also the smallest and the largest for these tasks (4.8 percentage points (pp) in the case of WP and 13.4 pp in the case of CSS). The average performance on the final test was noticeably lower (58.6%) compared to the midterm tasks, but students were very successful in meeting the ICDL standard in terms of grades: on average, 92.1% of them achieved a grade of 8 or higher (among those who passed the exam). Among the students who passed the exam, on average, approximately 55% of them satisfied all the requirements for obtaining an international certificate.

Table 2 - Averages (AVG) of the percentages of students who met the ICDL criterion and standard deviations (STD)

	HTML	CSS	WP	Test	Grade	ICDL
AVG (%)	89.2	83.6	94.1	58.6	92.1	54.6
STD (pp)	7.2	13.4	4.8	7.0	6.4	7.4

The remainder of this section is dedicated to a detailed review of student performance in the *Introduction to Web Design* course during the academic years from 2016/17 to 2023/24, according to various criteria for obtaining the corresponding ICDL certificate (midterm tasks, final test, grade). For easier comparison of student performance across the covered years, the charts with the results also show the average performance in the form of a horizontal line. When interpreting the presented results, it should be noted that a statistically significant association between the academic year and fulfillment of the ICDL standard was observed only in the case of the CSS results (Table 3 in the Appendix).

Figure 1a shows that the percentage of students who met the ICDL criteria in the HTML task of the first midterm exam ranged between 78.2% (2021) and 96.2% (2018). A slight increase between 2016 and 2018 was followed by a noticeable trend of declining performance during the period of online classes due to the COVID-19 pandemic (from the academic year 2019/20 to 2021/22), after which a gradual improvement in student results was observed again.

When it comes to the CSS task, the best result was achieved by students who attended the course in 2016 and 2018 (96.2%), and the worst by students from 2021 (61.8%). The performance of students who attended the course in 2021/22 was significantly lower than those in 2016/17 and 2018/19 (Table 4 in the appendix). Moreover, the chart in Figure 1b clearly

shows a downward trend in results over time, especially during the COVID-19 pandemic (from 2019/20 to 2021/22) when we were forced to hold classes online.

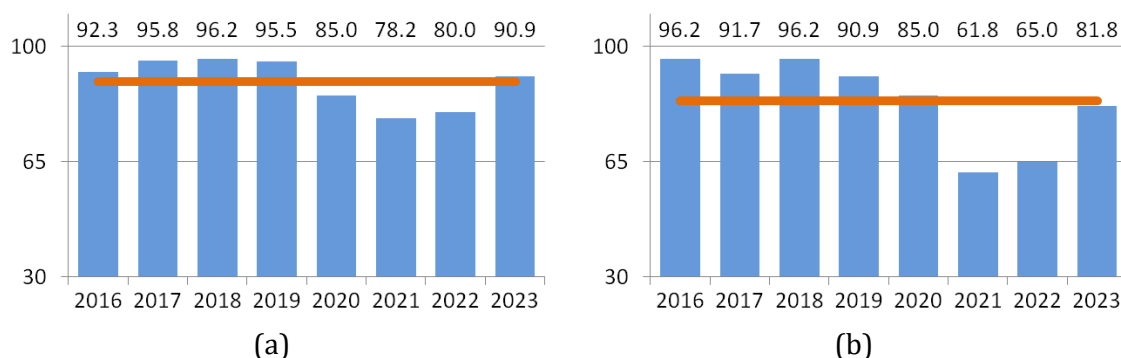


Figure 1 - Percentages of students who met the ICDL standard within the HTML (a), and CSS (b) task of the first midterm exam

The percentage of students whose success on the WordPress task reached the threshold required for the ICDL standard ranged between 86.3% (in 2021) and 100.0% (in 2018 and 2019), with a slight downward trend between 2019 and 2021 (which coincides with the COVID-19 pandemic), and which was followed by a slight growth trend (Figure 2a).

In terms of the final test, students achieved noticeably weaker results compared to their performance on midterm tasks (Figure 2b): the condition for the ICDL standard was met by between 50.0% (2019) and 69.6% (2018) of them. In contrast to the practical tasks at the midterms, in the period of online teaching during the COVID-19 pandemic (from 2019/20 to 2021/22), the results achieved on the final test showed a moderate trend of improvement.

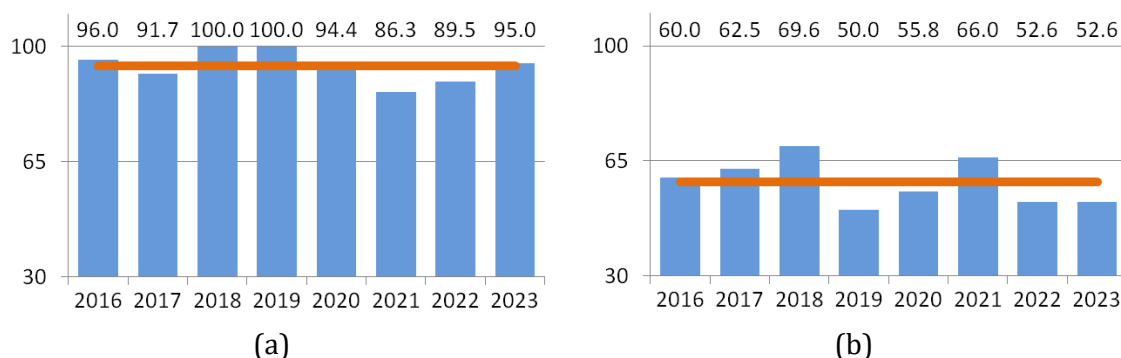


Figure 2 - Percentages of students who met the ICDL standard within the second (WP) midterm exam (a), and in the final test (b)

In terms of grades, the percentage of students who met the criteria of the ICDL standard (i.e. that their grade should not be less than 8) ranged between 100.0% (2019) and 78.9% (2022), which is presented in Figure 3a. The negative impact of online teaching during the COVID-19 pandemic, which was observed when considering the midterm results, is also present here: a clear downward trend is noticeable from 2019 to 2022.

The chart in Figure 3b visualizes the percentage of students who met all the necessary conditions for obtaining an international certificate among those who passed the exam. Their share ranged between the same limits as in the case of the final test (Figure 2b), i.e., between 50.0% (2019) and 69.6% (2018). At the same time, a slight increase in percentages is observed

from the beginning to the end of the COVID-19 pandemic, which is likely a result of a similar trend in meeting the ICDL requirements regarding points achieved on the final test (Figure 2b).

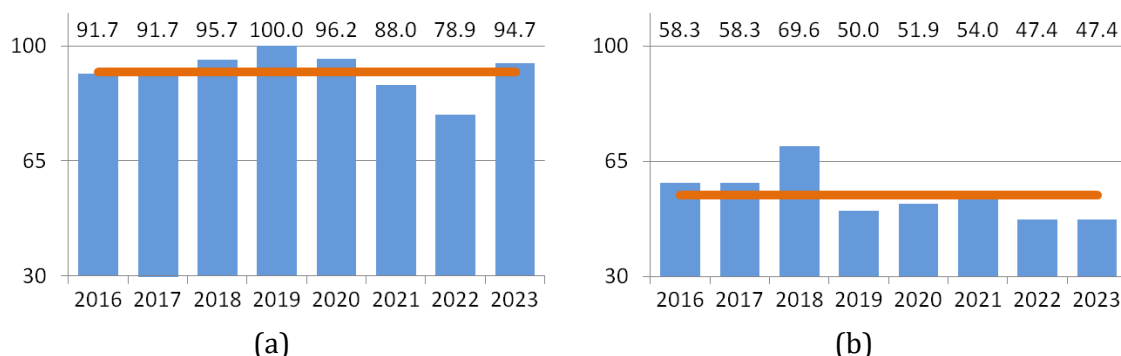


Figure 3 - Percentages of students who met the ICDL standard regarding the grade (a), and percentages of students who met all the requirements for obtaining the ICDL certificate (b)

3. CONCLUSION

This paper provides a comparative overview of the success of students at the Faculty of Philosophy, University of Novi Sad, in meeting the criteria for obtaining the ICDL certificate through attending the elective course Introduction to Web Design during the period between the academic years 2016/17 and 2023/24. An analysis of their performance at the level of individual midterm tasks, the final test, obtained grades, and meeting all the necessary criteria for the certificate was provided.

The average percentage of students who met all the requirements for obtaining the ICDL certificate during the considered period was approximately 55%, with a slight downward trend.

Considering individual criteria, students were, on average, extremely successful in creating websites using the WordPress platform (among those who took the second midterm, about 94% met the ICDL criterion) and in terms of exam grades (approximately 92%). They also achieved a high level of success using basic web page creation tools such as HTML (about 89%) and CSS (close to 84%) languages. At the same time, a downward trend was visible in the results of all these categories. The weakest average result was achieved on the final test (a little over 58%).

The negative impact of online classes during the COVID-19 pandemic (between the academic years 2019/20 and 2021/22) on students' success in meeting ICDL criteria in practical tasks within midterms was particularly noticeable.

When interpreting the presented results, it should be taken into account that *Introduction to Web Design* is an elective course and, therefore, the midterms and final test were probably taken mostly by students who were more interested in this specific area of computer literacy.

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5. APPENDIX

Table 3 - Results of Fisher's exact test of association between academic year and fulfillment of the ICDL standard

HTML	CSS	WP	Test	Grade	ICDL
.176	<.001	.384	.811	.270	.841

Table 4 - Holm-Bonferroni corrected p-values of pairwise Fisher's exact tests of associations between the academic years and the fulfillment of the ICDL standard within the CSS task

	2016	2017	2018	2019	2020	2021	2022
2017	1.000						
2018	1.000	1.000					
2019	1.000	1.000	1.000				
2020	1.000	1.000	1.000	1.000			
2021	.028	.181	.028	.315	.150		
2022	.326	1.000	.326	1.000	1.000	1.000	
2023	1.000	1.000	1.000	1.000	1.000	1.000	1.000