

NOTE-TAKING – A CONDITION FOR INCREASING THE EFFICIENCY OF LEARNING*

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DOI: 10.5281/zenodo.18023827

Abstract

Note-taking constitutes both a process and an outcome that are closely associated with academic performance, reflecting the distinctive learning style of each individual. The skill of taking notes, as well as the manner in which it is practiced, is developed in direct relation to educational activities, yet it can be continuously refined and adapted throughout one's life. The diverse methods employed in recording notes reveal not only personal preferences but also the gradual evolution of these techniques over time.

The present study aims to investigate the issue of student note-taking, with a focus on identifying the methods most frequently employed for this purpose. Considering that the target-group participants are engaged in initial teacher training, this topic is also of interest from the perspective of the models they will later provide to their future students. The sample consisted of 68 undergraduate and graduate students from the University of Craiova.

The results of our investigation revealed that students perceive digital note-taking formats as having multiple advantages, while also reporting various difficulties encountered in the note-taking process and expressing a need for support in this area.

Key words: *Note-taking, Student note-taking strategies, Cognitive processes in note-taking, Note-taking skills and academic performance.*

1. Introduction

Note-taking represents an important process within learning activities, most often being regarded as a constitutive element of knowledge that is externally stored (Forte, 2020, apud Pitura, 2023, p. 102).

Some authors (Marin, Sturm, & Vlieghe, 2021) prefer the term note-making instead of note-taking, arguing that note-taking is a form of writing that does not involve transcribing someone else's discourse, but rather translating it in such a way as to "render present the new thinking that takes place between the lecturer and the students."

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Empirical studies show that note-taking is an effective method that supports learning processes (Yinghui Shi *et al.*, 2022). Thus, note-taking involves active listening, connecting and correlating new information with existing knowledge, as well as identifying questions that require clarification in order to enhance the understanding of concepts and ideas (O'Hara, 2005, as cited in Yinghui Shi *et al.*, 2022, p. 1).

In the process of note-taking, students engage a wide range of cognitive functions and abilities, as they must process information, make decisions about which elements to record, retain information temporarily in working memory while writing it down, and even organize, paraphrase, or elaborate on it (Bui *et al.*, 2013; Piolat *et al.*, 2005, apud Jiang *et al.*, 2018). The same authors identify two important functions involved in this process: the first is encoding, which involves recording information in the form of notes in order to support memorization; the second is external storage, which refers to the use of notes as an external memory repository that can be accessed at any time (Jiang *et al.*, 2018, apud Pitura, 2023, p. 102).

The content of notes may reflect a certain level of cognitive processing. There are students who copy information superficially, whereas others engage in deeper levels of cognitive processing, relying on summarization, extraction of essential ideas, making inferences, formulating hypotheses, establishing connections, self-questioning, and constructing cognitive maps, etc (Craik & Lockhart, 1972, apud Jiang *et al.*, 2018).

2. Note-Taking Methods: Characteristics and benefits

The process of note-taking can be carried out using a variety of methods and techniques and may involve different tools. In what follows, we aim to inventory the most frequently used approaches. First, however, it should be noted that this process is clearly influenced not only by the evolution of psychological theories regarding learning, information processing, encoding, and storage, but also by technological developments. Thus, note-taking has evolved from exclusively handwritten formats to contemporary approaches that employ various digital tools.

Students now have the option of taking notes either using the traditional pen-and-paper method or by using computers for digital note-taking (Siegel, 2023).

Digital note-taking can be carried out in two forms: individual (using laptops or other mobile devices) and collaborative (Yinghui Shi *et al.*, 2022).

Regarding the efficiency of note-taking depending on the method employed, opinions are divided. Some studies emphasize the advantages of handwritten notes, while others highlight the benefits of notes produced using digital tools or equipment.

There is also research that comparatively examines collaborative note-taking versus receiving notes provided by the instructor. The conclusion of these studies is that, although test scores did not differ significantly between the two conditions, measures of writing quality—both at the group and individual levels—were significantly higher in the collaborative online note-taking condition than when students relied on notes supplied by the teacher (Fanguy, 2025). Some studies specifically compare individual and collaborative note-taking approaches (Courtney *et al.*, 2022). Regarding these two note-taking modalities, a 2023 study by Fanguy

et al. concludes that the effectiveness of collaborative note-taking may depend on the learning context or the intended outcome of the lesson. The study found that students in the collaborative note-taking group performed better on retention measures, whereas the individual note-taking group performed better on academic writing assessments (Fanguy *et al.*, 2023).

A study conducted by Jiang *et al.* (2018) presents the benefits of note-taking in open virtual environments compared to note-taking during lectures or based on written texts. In the former case, multimedia information is distributed through various representations, such as animations, graphics, videos, audio recordings, etc. The content is non-linear, allowing students to select, process, and record information at their own pace.

In a recent study, Al-Sharman *et al.* (2025) demonstrate that students who used handwritten notes exhibited significantly higher general cognitive scores, along with faster information processing, better working memory, and enhanced visual memory, compared to those who used digital styluses for note-taking. However, students who employed digital styluses for note-taking displayed superior inhibitory cognitive control.

One of the primary benefits of note-taking is that it actively engages students during a lecture, prompting them to listen to the instructor to acquire important knowledge and record it in their own words (Salame & Thompson, 2020). The authors also note that note-taking supports problem-solving and contributes to enhancing understanding and learning.

Numerous studies examine the relationship between note-taking and reading comprehension (Siswanto, 2019; Ganap & Kondo, 2025; Siegel, 2025).

In a recent study, Gerlich (2025) investigates the relationship between critical thinking skills and the use of AI, focusing on Cognitive offloading as a mediating factor in this relationship.

Among the most frequently used **note-taking methods**, the following can be highlighted (Alda, 2023, pp. 16–27; Karadağ, K., Devocioğlu, M., & Benzer, 2022):

a) The Outline Method – This method requires structuring information into hierarchical points and subpoints.

Steps involved: use indentation to organize information according to its level of generality and importance; record main ideas as headings; under each main idea, add details, explanations, examples, or clarifications, moving to a deeper level of indentation; the outcome is a logical framework of the information.

b) The Cornell Method – Created by Professor Cornell, this method divides the page into three or four sections to facilitate understanding, review, and memorization of information. The page is structured as follows:

- **Note-taking area (large column, right side):** Notes are recorded during the lecture or reading, including main ideas, concepts, diagrams, and examples.
- **Cue column (small column, left side):** After the lecture, key words, questions, essential concepts, or reflective prompts are recorded here.

- **Summary (bottom section):** A few sentences summarizing the main ideas of the page are written in this section.

c) **The Boxing Method** – This is a visual note-taking technique in which information is grouped into separate “boxes” on the page. Each box contains a topic, main idea, or category of information.

How to use it: The page is divided into distinct areas (boxes), each assigned a specific theme (e.g., definitions, examples, formulas, etc.). Relevant information is then recorded within each box. The boxes can also be organized in a way that allows marking relationships or connections between them.

d) **The Mapping Method** – Information is visually organized around a central idea, with connections between concepts represented by branches.

Steps for creating a concept map (Mogonea, 2005, p. 207): Read the full text, topic, or chapter, etc; understand the material, condense it, and extract essential ideas in the form of 10–15 key words; graphically organize the concepts, starting with the central concept, followed by derived concepts (constituting the “nodes” of the map), and then a third layer of concepts if needed, depending on the complexity of the topic; graphically mark relationships between concepts (subordination, equivalence, reciprocity, etc.); indicate, if applicable, examples corresponding to each concept; complete, refine, and finalize the map by eliminating unnecessary or redundant information.

e) **Charting Strategy** – this is a note-taking method that organizes information into tables (charts), dividing the content into clear categories. It is particularly useful for dense, structured materials or content that involves comparisons. Steps: establish the categories (e.g., definitions, examples, causes, effects, etc.), create a table with columns corresponding to each category, fill in the table by recording information in each column as it is presented.

f) **Flow-Based Note-Taking** – this method follows the natural flow of thoughts and information, without a rigid structure. The main idea is to write quickly, freely, and continuously, capturing the essence of the lecture or reading in real time.

3. Research Design

The purpose of our investigation was to explore students’ opinions regarding note-taking, including the methods they prefer and consider effective for recording information.

For this, the following objectives were established:

- To examine participants’ views on the importance of note-taking and the frequency they engage in this activity with.
- To identify the note-taking formats preferred by students.
- To inventory the methods most commonly used by students for recording notes.
- To create an inventory of the advantages and disadvantages of students’ note-taking practices, with the aim of optimizing this activity.

The research hypothesis aimed to identify the existence of a relationship between note-taking activities and academic performance.

The target group consisted of 68 undergraduate and graduate students who, alongside their university studies in their respective fields, were enrolled in an initial psychopedagogical training program designed to prepare them for future teaching careers. The majority of respondents were female (85.7 %). Nineteen participants were undergraduate students (Cycle I), while 44 were graduate students (Cycle II).

Regarding the participants' ages, most were between 20 and 24 years old, although there were also individuals under 20 and over 50 years old (see Figure 1 for details).

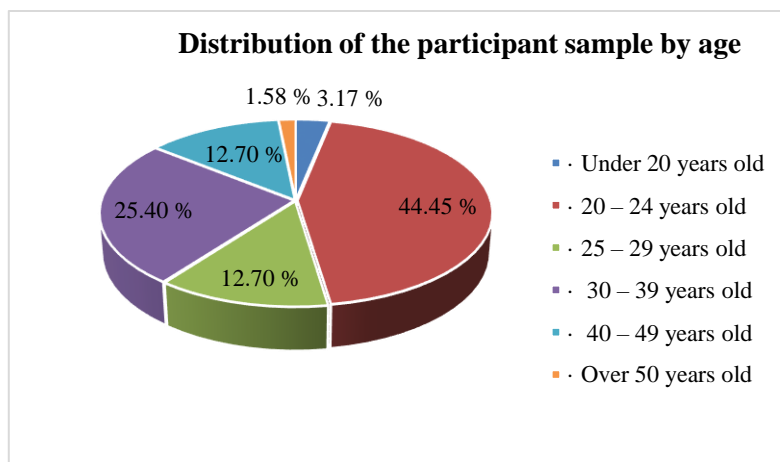


Figure 1. Distribution of the participant sample by age

The research method used was a questionnaire survey, administered via a Google Form.

The questionnaire included 14 items of various types (closed-ended, open-ended, and semi-closed), allowing participants not only to select a preferred option among those provided but also to express their personal viewpoints. The questionnaire items were grouped into several thematic sections according to their content.

One section focused on note-taking habits, including the frequency of taking notes during lectures and seminars, the preferred format and reasoning behind the choice, the average time spent reviewing notes after classes, and the clarity of the notes. Another section included items aimed at identifying attitudes and preferences, such as the perceived importance of note-taking, the methods employed, the ways and degree of information structuring, the relationship between taking notes in a specific format (e.g., digital) and academic performance, and the frequency of sharing notes with peers.

There were also open-ended items, which constituted a separate section of the instrument. These items aimed to identify the advantages of digital note-taking compared to the traditional pen-and-paper method, to inventory the disadvantages of the note-taking method used, and to collect suggestions for improvement.

The factual questions in the questionnaire requested information considered relevant to the research problem: the type of university program attended (undergraduate/ graduate), faculty, gender, and age.

4. Results and Discussion

For the item regarding the frequency of taking notes, most responses were concentrated in two of the available options: “always” (38.20 %) and “frequently” (45.60 %). A smaller proportion of participants (13.2 %) selected “sometimes.” It is worth noting that no student chose the option “never” (see Figure 2).

Response options:

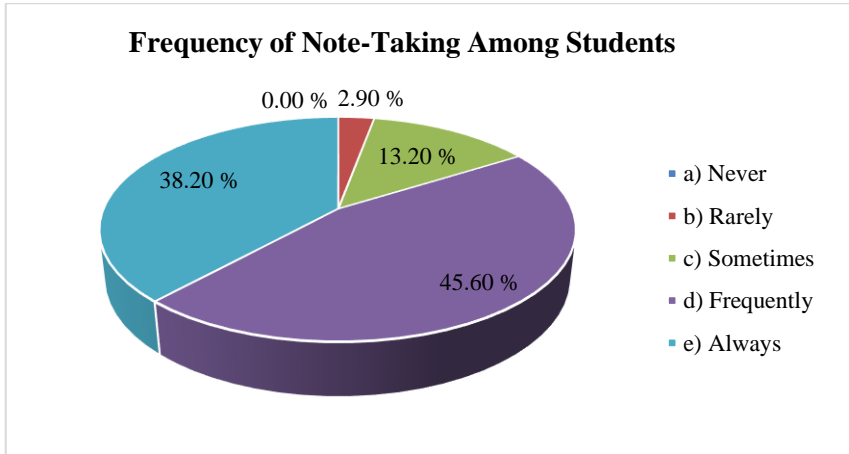


Figure 2. Frequency of Note-Taking Among Students

Regarding the preferred format for taking notes, a large majority (94.1 %) reported using the traditional paper-based format. Other formats were selected by a notably smaller number of students: mobile phone (17.6 %), tablet (5.9 %), and laptop (7.4 %) (see Figure 3). It should be noted that, for this item, the students were allowed to select multiple response options.

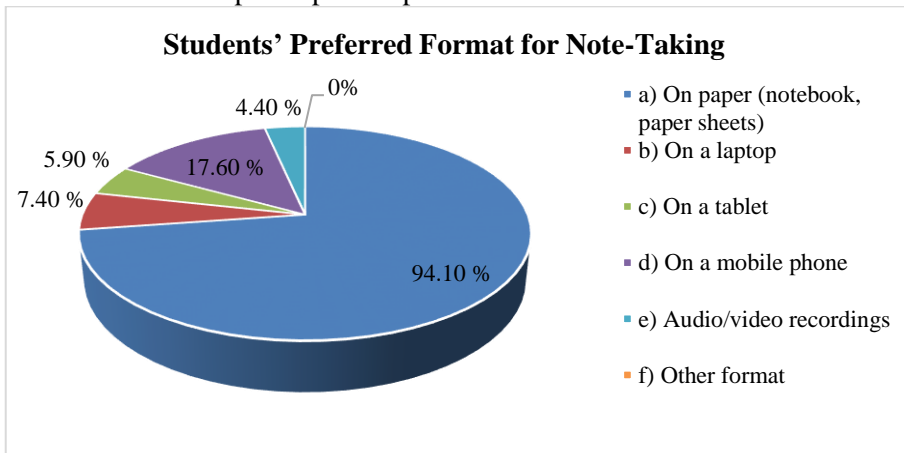


Figure 3. Students' Preferred Format for Note-Taking

The reason most frequently cited by the respondents (52.90 %) for choosing their preferred note-taking format was that it helps them retain information more effectively. A part of the participants (23.5 %) considered their chosen method to be faster, while others (22.1 %) believed it allows for better organization of information (see Figure 4).

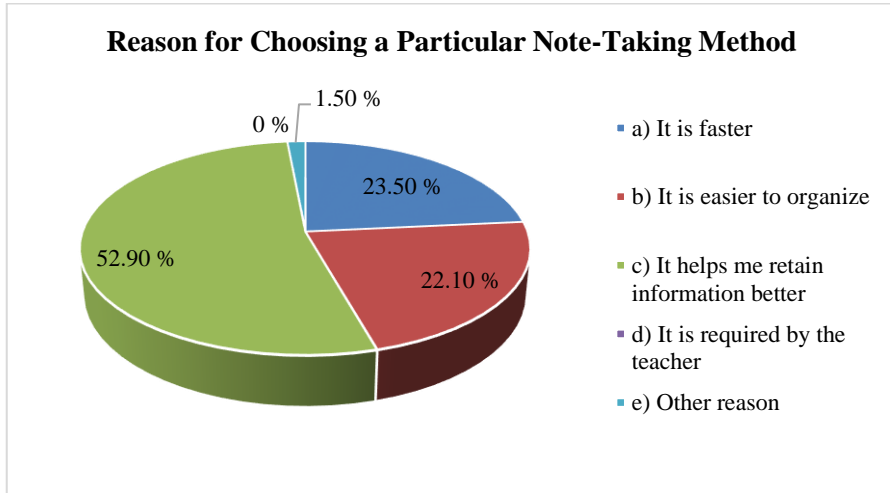


Figure 4. Reason for Choosing a Particular Note-Taking Method

Almost half of the respondents (42.6 %) reported that, on average, they review their course or seminar notes once a week. Approximately one quarter of the participants (26.5 %) acknowledged that they revisit their notes only before examinations. The distribution of responses for the remaining answer options is shown in Figure 5.

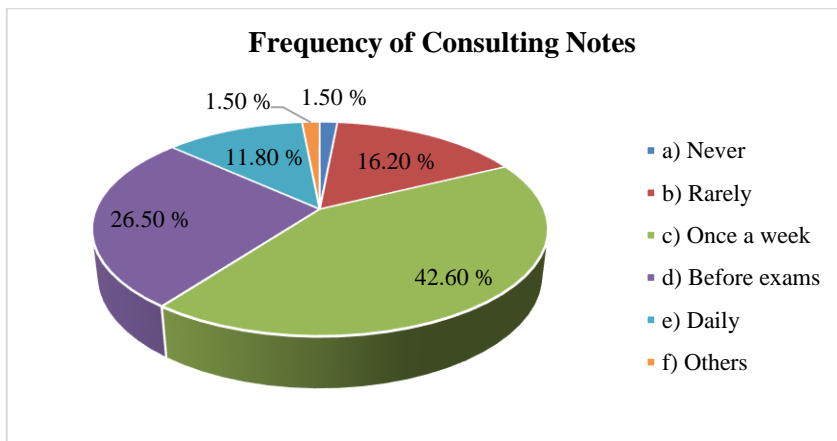


Figure 5. Frequency of Consulting Notes

The responses related to the clarity of the students' notes were distributed in relatively balanced proportions between the top two answer options: "very clear" (38.2 %) and "clear" (45.6 %) (see Figure 6).

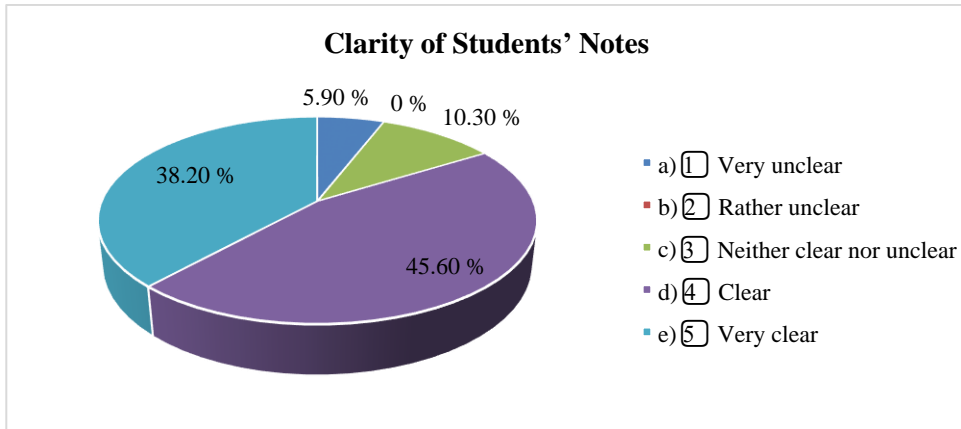


Figure 6. Clarity of Students' Notes

Most participants considered the activity of taking notes to be "very important" (64.7 %) or "important" (25 %), while only 8.8 % rated it as "moderately important," according to the responses provided to this item.

A multiple-response item examined the methods students use to structure their notes. According to their responses, the most frequently preferred methods were: "highlighting" or color-coding (63.2 %), subpoints and lists (48.5 %), and diagrams, charts, or mind maps (44.1 %) (see Figure 7).

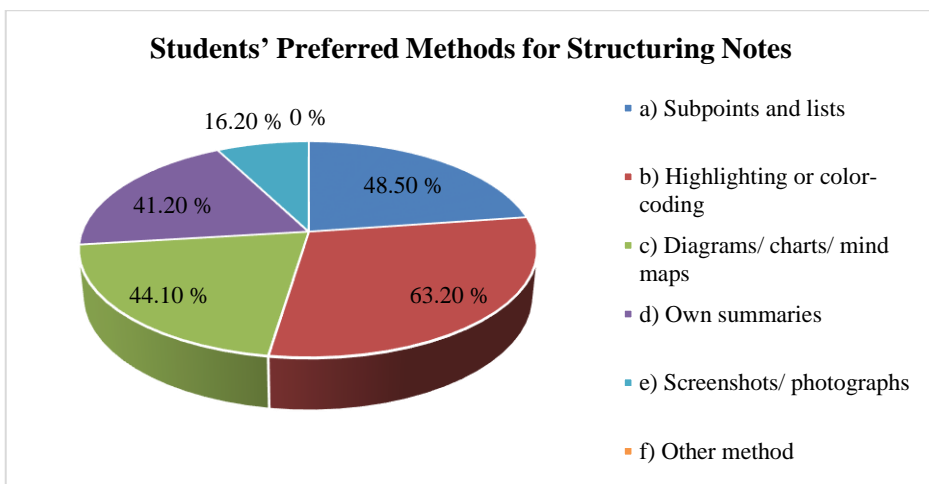


Figure 7. Students' Preferred Methods for Structuring Notes

Approximately half of the respondents (50 %) stated that taking notes improves their academic performance, while 30.9 % reported being unsure, and 19.1 % indicated that note-taking does not have this effect for them.

Note exchanges with peers were not frequently used, as indicated by the participants' responses. The distribution of answers across all response options is presented in Figure 8.

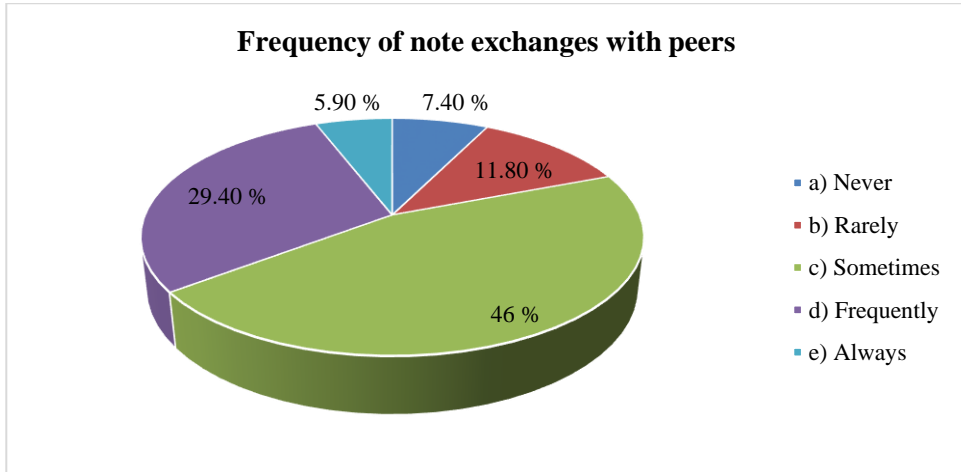


Figure 8. Frequency of note exchanges with peers

Regarding the students' perceived ease of taking notes in a digital format, a substantial proportion reported a moderate level of ease (41.2 %), while 29.4 % stated that it is easy for them to take notes this way (see Figure 9).

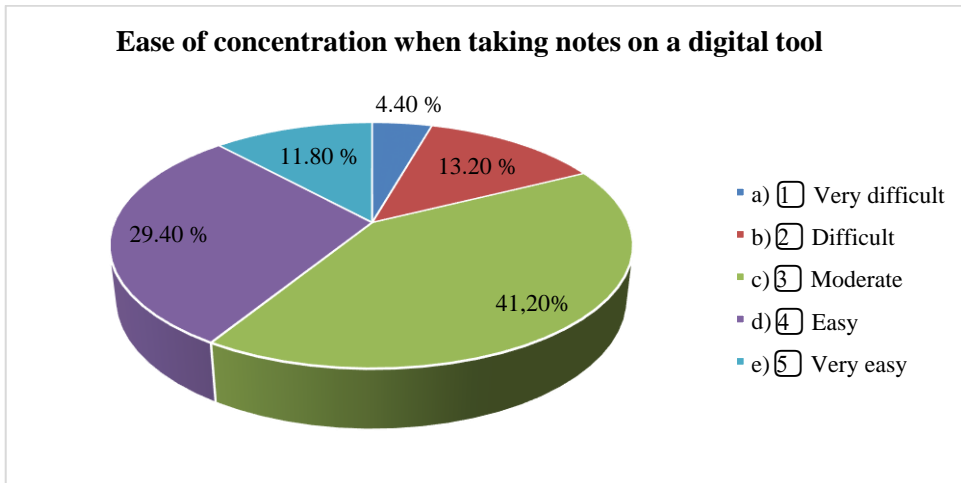


Figure 9. Ease of concentration when taking notes on a digital tool

Almost 70 % (69.8 %) of those who responded to the opinion questionnaire stated that they prefer to take schematic rather than detailed notes (23.8 %). 6.3 % of students could not appreciate it.

We have compiled a list of the advantages of taking notes on a digital tool, compared to the classic version, most frequently highlighted by the students:

- Ease of organizing and searching for information - they can be structured into folders, labeled. They can be quickly searched for by keywords.
- Multiple accessibility - they can be accessed from multiple devices (laptop, phone, tablet).
- Possibility of editing, updating - you can modify, add or delete information.
- Easy sharing with other colleagues.
- Multimedia integration - in digital format, images, video clips, links or audio recordings can be included, improving the understanding and retention of information.
- Some applications allow the development of much clearer schemes than those made on paper.
- Notes on digital media can be more flexible and can be more easily transferred into a document.
- They allow the improvement of digital skills.
- Possibility of using the autocorrector.
- Convenience - it is no longer necessary to have and carry many notebooks/ paper sheets.
- When you encounter an unknown term, most applications allow you to access, with one click, sites that provide details regarding etymology, definition, etc., saving time.
- Immediate note saving for a longer period, the possibility of keeping them in the cloud, so you do not risk losing them.
- Higher speed of noting information, readability.

Although most students mentioned the advantages of the digital format, there were also opinions that supported the efficiency of the classic version: "I don't see the advantages, for me it's better to take them on paper". "I'm old-fashioned. I don't like taking digital notes".

The self-analysis of identifying the disadvantages of the students' own way of taking notes, highlighted the following:

- Difficulty in organizing - they are not structured exactly as thought of later.
- They can be easily lost if they are not saved properly.
- I rarely review my notes, so I forget some information.
- The possibility of distracting attention from what the teacher is teaching.
- Difficulty structuring essential ideas and prioritizing them.
- Hasty and unclear writing, little time to write, incomplete notes.
- The desire to write everything the teacher says, difficulty in creating a summary of the course.
- Notes that are too detailed, lack of a clear structure, writing too quickly which can lead to errors.

- Difficulty concentrating both on what the teacher is teaching and on writing down ideas, as much as possible in an essentialized form.

The suggestions of how students can be supported in improving their note-taking were:

- Providing visual materials before the course (handouts, slides, diagrams).
- Using educational applications or platforms that facilitate note-taking and student-teacher, student-student collaboration.
- Organizing activities that teach effective methods of structuring notes.
- Encouraging collaborative notes (small groups that create a common set of notes).
- Information presented on digital media, projected during the class, on the basis of which notes can be taught and taken.
- Teachers can support students in taking notes more effectively by encouraging the use of mind maps and diagrams.
- Using a laptop or tablet to take notes. This way, paper is no longer wasted and notes can become more useful (images, links can be added).

5. Conclusions

Following our investigation, we can extract several important ideas regarding the problem under analysis, some of which can be used in the perspective of providing support to students to improve their note-taking skills:

- Students consider the process of taking notes during courses/ seminars important.
- Although they recognize the importance of notes, the number of those who systematically rewrite and revise their notes is not very high.
- Although they recognize the advantages of each way of taking notes, most students lean towards the digital format;
- Among the most frequently listed advantages of the digital format for taking notes, students list: ease of recording; possibility of subsequent completion and adjustment; ease of keeping notes and quick access, transfer to different devices; possibility of quick sharing with other colleagues.
- The difficulties that students face in taking notes are related to the essentialization of information and its graphic ordering; distributive attention; distraction from essential information; subsequent organization of notes, in order to achieve an overall, global perspective on the topics taught.
- The suggestions for improvement offered by the students highlighted the need for support from teachers. Thus, two important ways were outlined in which teachers can support students' note-taking in a way and format that is useful to them: on the one hand, the teachers' use of schemes, diagrams, and synthetic presentations in digital format, and, on the other hand, the organization of activities intended to present and practice note-taking methods and techniques.

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