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Knowledge and Uncertainty Research Laboratory

MSc Thesis

# Educational Content Co-Creation Between Experts and Students

*Creating a platform that will help in the  
Co-creation of academic/educational content  
between experts and students*

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## **ABSTRACT**

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This paper describes the idea of the creation of a tool that will help both students and teachers to share their knowledge and co-create academic content. This tool's purpose is to make knowledge more interesting by making students a part of the course design and improve the communication between students and teachers. This way, students are becoming more involved in the process and teachers can understand their students better. Each student will have the choice to pick a layout and method according to his favourite teaching method and the content will be adjusted, according to her preferences. During this study, we examined the idea of co-creation in the academic environment and we gathered the opinions of both teachers and students about what they are expecting from this tool and what are their thoughts about it. We discuss every scenario and the benefits in a classroom, taking care of any learning traits, difficulties or special needs of the user. The main goal is to improve the collaboration between experts and non-experts, to create an ideal team environment and to evaluate if an ideal work environment can make an impact during the learning experience.

## **1 INTRODUCTION**

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We are designing a platform that will help both teachers and students to become active members of the creation of the course's content. Every user will have the ability to share their knowledge and communicate their thoughts about the course. Teachers will be in charge of sharing the topic of every lecture and making sure that no incorrect information is uploaded. Students will have the role of the researcher, by finding and sharing academic articles from reliable scientific libraries and will be able to participate in q&a sessions about each article. In this study, we will research how this platform could impact in the improvement of the student's participation and the teacher's better understanding of their classroom. Many learning styles and motives will be examined and will be matched to the corresponding student's learning profile. The collaboration of non-experts will be evaluated by the creation of teams. We will also see every profit and disadvantage of a platform like this, questioning the validity of the content, the motivation, how the interface could make an impact and how possible it is to create the ultimate team. Various use cases will be developed and analysed during the study.

### **1.1 HISTORICAL BEGINNINGS OF LEARNING COMMUNITIES**

Influenced by John Dewey's focus on student-centered learning, Alexander Meiklejohn helped the University of Wisconsin to establish the Experimental College in 1927 to provide an

interdisciplinary undergraduate curriculum focusing on democracy. Meiklejohn's experimental project is characterized by many as the first learning community. Unfortunately, the Experimental College at the University of Wisconsin was discontinued in 1932. The idea of the learning community was inactive for many years until Joseph Tussman, one of Meiklejohn's students, established the learning community program at the University of California at Berkeley in 1969, but this program was also short-lived. Both Meiklejohn's and Tussman's models evolved over time and prospered in the late twentieth and early twenty-first centuries. [7]

## **1.2 ELEMENTS OF LEARNING COMMUNITIES**

According to Tinto, five conditions are necessary for undergraduate student success:

1. high and clear expectations
2. support
3. feedback
4. involvement, and
5. relevant learning.

with the first three conditions to occur in many first-year classes and student support services and the latter two to happen less frequently in the lower divisions of undergraduate coursework. Learning communities serve the purpose to provide the two last conditions (involvement and relevant learning) to lower division undergraduates if they are designed and integrated with other first-year courses. Learning communities vary from institution to institution in their structure, but the common element is that they have the goal to bring together students and faculty through a common purpose or vision in two or more courses during the learning process. One common aspect of learning communities is the Freshman Learning Community, which aims on making the overall experience of first-year college students better and more diverse. Students can join learning communities based on academic majors, interests, hobbies, cultures, religion, and sports. Most learning communities are based on Tinto's Model of Interaction to provide a theoretical foundation for research about student success. Learning communities encourage student participation and motivate students with peer-involved learning, providing them with the best possible tools to achieve their goals. In some cases, institutions adapt their curricula to assist student involvement and minimize the gap between students and their academic staff. For instance, seminars or peer-advising components, such as student-organized study sessions designed to help students not only study, but also interact with other students and the academic faculty. Learning communities can become a great environment for students to cooperate, feeling a sense of common purpose and community. [7]

## **1.3 IMPACT OF LEARNING COMMUNITIES ON STUDENTS**

It is observed that students who participate in learning communities have a higher success rate. They also have an increased sense of responsibility to participate in the learning process and an increased awareness of their responsibility for their learning and the learning of others. This leads us to the conclusion that learning communities are positively linked to engagement as well as to student self-reported learning outcomes and overall satisfaction with the

institution. Students are paying attention and working not only for their success but also for the success of the institution in general. [7]

## **1.4 IMPACT OF LEARNING COMMUNITIES ON INSTITUTIONS**

The positive outcomes of learning communities influence not only the success of students; but the institution as well. Learning communities create a more diverse student environment, building a more welcoming and friendly environment for every member of the academic society. A stronger bond to the institution between faculty, staff, and students increase the probability for student retention. Learning communities also give a better view of the classes and the academic staff can modify the course based on the students' participation.

Studies show that, first year students with higher high school GPAs and male, part-time, and commuting students are less likely to join a learning community than their counterparts. There are indications that participating in a learning community does not have a statistically significant effect on first-year students' persistence to the second year. The only factor that seems to have an impact on first-year students' GPA is their high school GPA. Interpretation of these results suggests these conclusions:

There is still more research to be done to determine the effects of learning communities on student learning. [7]

## **1.5 ONLINE LEARNING COMMUNITIES**

Before discussing how the new technologies can affect students and their learning process, it is important to see how they build and maintain those communities. The students engage with each other creating strong bonds of friendship and providing one another with emotional support. They also create intensive working relationships that involve frequent communication. Students use technology to share learning material, investing their time in learning how to use available technologies and how to implement them effectively in distance education. In addition, students develop their own identities and skills within the learning community. [9]

There are many reasons why people turn to online learning communities. They afford flexibility of schedule and every course material can be accessed where it is convenient. It is preferred because the learner can implement it to their routines and schedules. Although online learning is becoming more common, it turns out that it is not threatening existing institutions but, on the contrary, giving every student an alternative to the traditional learning and a new way of promoting community. [17]

Group formation is very important in facilitating collaborative learning (CL) since negative effects might occur if there is lack of careful consideration in the process of grouping students. [21]

## **1.6 COMPUTER SUPPORTED LEARNING COMMUNITIES**

Nowadays, educational institutions are forced to create innovative pedagogical and cognitive models and practices. In this development, computers will play an important role. Computer supported collaborative learning (CSCL), especially, offers new ways to make the teaching-learning process easier and to prepare students for the future. Recent research on CSCL has indicated several positive effects: enhanced individual learning outcomes; and higher group performance, especially with regard to knowledge construction. In advanced pedagogical practices, the use of CSCL becomes an integrated part of the whole learning environment and the culture of learning. This means that technology is used for building up social structures that encourage learning, for supporting reflective discourse and for helping students and teachers build knowledge and deepen their understanding of different subject domains. In CSCL, the traditional role of the teacher as is changed from information provider to facilitator and co-learner. This means that the teacher becomes more active during the learning and teaching process, collaborates with his/her classroom, encourages the classroom to collaborate motivating them to monitor their understanding without giving them information), communicates with them and examines the knowledge produced by the students. The last two appear to be extremely important in the case of networked learning environments such as CSILE. Computer supported learning environments offer a new perspective where the teacher is not controlling the learning process but rather guides his/her students to create the knowledge by cooperating. That helps students to negotiate, share their ideas and knowledge and become active during the learning process. [12]

## **1.7 SOCIAL MEDIA AND LEARNING COMMUNITIES**

Social networking sites (SNSs) can be defined as those sites sharing a variety of technical features that allow individuals to form associations, linked by heterogeneous motives, and constitute a social structure (“social network”) made up of nodes interlinked by more than one type of relationship [4]. SNSs typically combine individual profile pages with various interaction tools, such as chat, blogs, forums, etc. This reinforces a sense of community and collaboration, which makes SNSs a viable alternative to proprietary course management systems such as Blackboard [5].

The learning process that takes place in a social network is the result of various transactions, of multiple exchanges between participants, who switch between teacher and learner roles. As a result, this characteristic is what distinguishes a teaching-learning situation that may occasionally emerge in the SNSs from those being promoted in a Learning Management System (LMS). The most substantial difference is that an LMS is an application that allows instructors, coordinator trainers and managers to monitor student participation in web-based and classroom training.

The learning results in a SNS closely match those from a collaboration experience between “colleagues”, who share and explore an area of knowledge. This idea acknowledges that the participants in a network have common learning objectives; they strive to create a common ground to share their experiences in class.

SNSs can become an incredible tool in collaborative work; the didactic possibilities afforded by these tools are almost endless when they are intended to promote interaction between the group, between the group and the teacher, and among teachers, all of which takes

place outside the time and spatial constraints of a school environment. Virtuality allows breaking these coordinates and facilitating interaction, sharing limitless files, of an also varied nature, and communicating in a way most similar to the way young people often do, combining audio, video and texts.

SNSs cater for individual differences to a great extent. It can easily be observed that in the SNSs, various subgroups are formed depending on the students' preferred cognitive styles (characteristic ways of taking in and processing information), their approaches to learning (surface, deep, and strategic), and their intellectual development levels (attitudes about the nature of knowledge and how it should be acquired and evaluated). [1]

## **1.8 CONTENT CO-CREATION IN EDUCATION**

When knowledge has to be made through collaboration, there are a lot of aspects that need to be examined. Different learning processes offer different outcomes. For example, when a team of students cooperate to create knowledge, every member needs to analyse, plan the learning process, set goals, determine the most appropriate strategies that suits everyone in the group, and manage their efforts. When using these metacognitive strategies, students must reflect on the learning process, constantly evaluate their performance, modify understanding of the topic, and monitor learning motivation.

When individuals work collaboratively in teams, at least three types of regulation come into play:

1. each group member takes responsibility for regulating his or her learning (SRL),
2. each student supports other group members in regulating their learning (co-regulated learning), and
3. the group collectively regulates learning processes (shared regulation of learning).

This indicates that when a group of learners cooperate to create knowledge, they have to work both as individuals and as team members, having responsibility not only for his learning but also for every team member. [3]



## **2 SITUATION INDEPENDENT ELEMENTS**

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### **2.1 COGNITIVE STYLES**

To begin with, a definition seems the best way to determine what cognitive styles and multiple intelligences are and how they can make an impact during the learning and teaching process.

Cognitive style is a person's preference and habitual approach to the organization and representation of information. [18] Various aspects of cognitive styles have been described by researchers. The most common are field dependent - field independent, impulsive - reflective, divergers - convergers, holist - serialists and verbalizers - imagers. Cognitive style focuses on the cognitive issues related to learning. There are mixed findings when it comes to cognitive styles and the behaviour of users. There might well be mixed - types and especially field - mixed types. However, when learning methods and material are corresponding to each student's cognitive style, there is an improvement in their progress. [2]

Another situation independent learning factor is the intelligence type. Gardner's theory of the seven intelligences implies that people learn in different ways. Traditional teaching cannot address all of these intelligences all of the time. For this reason, a single teaching method will help certain students. Adaptive educational technology could provide a solution to this problem.

Other situation independent factors are: age, pre-knowledge, maturity, confidence, preferences, background, responsibility, gender, attitudes, working memory and others. Further research is needed, since there has not been much research addressing these factors. [2]

### **2.2 THEORY OF MULTIPLE INTELLIGENCE**

The theory of Multiple Intelligence was developed from Howard Gardner in the late 1970s and early 1980s.

The theory is a critique of the standard psychological view of intellect: that there is a single intelligence, adequately measured by IQ or other short answer tests. Instead, he believes that every person has a lot of intelligences that affect his/her intellect. IQ tests assess linguistic and logical-mathematical intelligence, and sometimes spatial intelligence; and they are a reasonably good predictor of who will do well in a 20th (note: NOT 21st) century secular school. But humans have several other significant intellectual capacities that should be accounted to measure his/her abilities. [8]

The most well-known groups of learners are given in the following three general categories: visual learners, auditory learners, and kinesthetic learners. But besides these three categories, there have been numerous theories about if there are other types of learners as well to be investigated. Among them is the theory of multiple intelligences, developed by Howard Gardner, Ph.D., Professor of Education at Harvard University. Gardner's early work in psychology and later in human cognition and human potential led to the development of the initial six intelligences. Today there are nine intelligences and the possibility of others may

eventually expand the list. These intelligences (or competencies) relate to a person's unique aptitude set of capabilities and ways they might prefer to demonstrate intellectual abilities. [14]

### **Gardner's Multiple Intelligences**

1. Verbal-linguistic intelligence (well-developed verbal skills and sensitivity to the sounds, meanings and rhythms of words)
2. Logical-mathematical intelligence (ability to think conceptually and abstractly, and capacity to discern logical and numerical patterns)
3. Spatial-visual intelligence (capacity to think in images and pictures, to visualize accurately and abstractly)
4. Bodily-kinesthetic intelligence (ability to control one's body movements and to handle objects skilfully)
5. Musical intelligence (ability to produce and appreciate rhythm, pitch and timber)
6. Interpersonal intelligence (capacity to detect and respond appropriately to the moods, motivations and desires of others)
7. Intrapersonal (capacity to be self-aware and in tune with inner feelings, values, beliefs and thinking processes)
8. Naturalist intelligence (ability to recognize and categorize plants, animals and other objects in nature)
9. Existential intelligence (sensitivity and capacity to tackle deep questions about human existence such as, What is the meaning of life? Why do we die? How did we get here?)

Gardner's multiple intelligence theory can be used for curriculum development, planning instruction, selection of course activities, and related assessment strategies. Teaching in a way that focuses on strengthening the student's abilities can boost his/her self-esteem. Students' multiple learning preferences can be addressed when instruction includes a range of meaningful and appropriate methods, activities, and assessments. [14]

The Intelligences that we are investigating in this study are the following:

- The Verbal-Linguistic Intelligence
- The Logical-Mathematical Intelligence
- The Spatial-Visual Intelligence
- The Interpersonal Intelligence
- The Intrapersonal Intelligence and
- The Existential Intelligence

Howard Gardner has created a document where he answers the most common questions to offer solutions to any problem about Multiple Intelligences.

The most interesting parts of his document associated with this study are examined below and are stated exactly as the author formulated his statements.

Intelligence is defined as a biopsychological potential of our species to process certain kinds of information in certain kinds of ways. That includes processes carried out by dedicated neural networks. Each of the intelligences has its characteristic neural processes, with most of them quite similar across human beings. Some of the processes might prove to be more customized to an individual.

An estimation of what probably happened according to Howard Gardner is that different kinds of intelligence evolved to help our species deal with certain kinds of problems and matters.

As H. Gardner states: "Style and intelligence are fundamentally different psychological constructs. Style refers to the customary way in which an individual approaches a range of materials—for example, a playful or a planful style. Intelligence refers to the computational power of a mental system: for example, a person whose linguistic intelligence is strong is able readily compute information that involves Language. It is possible to integrate the notion of style with the notion of intelligence. Two people might have comparable linguistic intelligence."

At this point we will investigate how someone can measure each intelligence. The MIDAS test, a test developed by Branton Shearer is the most commonly known way to measure each intelligence.

The results of these tests are not supposed to be accurate and definite but to give the main idea to the person taking the test. They suffer from two deficiencies:

1. They don't actually measure strengths—you would need performance tasks to determine how musically intelligent, or spatially intelligent, or interpersonally intelligent a person is;
2. The tests assume that the person has good intrapersonal intelligence—that is, he or she knows himself well. But many of us think that we know ourselves better than we really do.

The main reason that it is believed that these tests are not accurate is that every person can not be objective and the answers are given by personal opinions rather than exercises to measure each intelligence.

The distinction of the intelligences could lead to a better evaluation of each person's abilities. This theory could assist learners, teachers and future employees and employers to perceive each person's abilities and strengths accurately. It should be considered, though, that there are no tools available to measure each intelligence and to create reliable outcomes after participating in a test. [8]

## 2.3 THE BIG FIVE

The Big Five framework of personality traits was designed for understanding the relationship between personality and various academic behaviours.

1. **Conscientiousness** is referring to how disciplined, organized, and achievement - oriented a person is.
2. **Neuroticism** is relevant to emotional stability, impulse control, and anxiety.
3. **Extraversion** is correlated with sociability, assertiveness and talkativeness.
4. **Openness** is describing strong intellectual curiosity and a preference for novelty and variety.
5. **Agreeableness** refers to being helpful, cooperative, and sympathetic towards others.

There is some evidence that personality and motivation are affecting learning styles, and educators are motivated to include these variables in understanding academic behaviour. [10]

Neuroticism (N) is the opposite of emotional stability. People high on the N scale tend to experience negative feelings as emotional instability, embarrassment, guilt, pessimism, and low self-esteem.

People high on the Extraversion scale tend to be sociable and assertive. Extraverts also prefer to work with other people.

Openness (O) is characterized by such attributes as open-mindedness, active imagination, preference for variety, and independence of judgment. Also, people who are high on the O scale tend to be less conservative and traditional.

People high on the Agreeableness scale are fundamentally altruistic, sympathetic, and readily helpful. Also, they value and respect other people's beliefs and conventions.

Individuals who are high on the Conscientiousness scale are characterized as being purposeful, strong-willed, responsible, and trustworthy. [22]

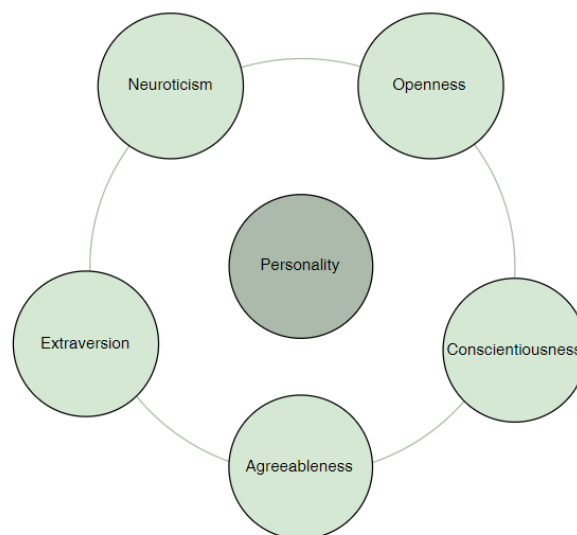


Figure 1 The Big Five.

## 2.4 LEARNING DIFFICULTIES

Learning disabilities are neurologically-based processing problems. These problems can interfere with learning basic skills such as reading, writing and/or math. They can obstruct higher level skills such as organization, time planning, abstract reasoning, long or short-term memory and attention. Learning disabilities can affect an individual's life beyond academics and can impact relationships with family, friends and in the workplace. [15]

Some of the learning difficulties that should be taken into account when creating an online educational platform are dyslexia, autism, visual difficulties, hearing difficulties and mobility difficulties.

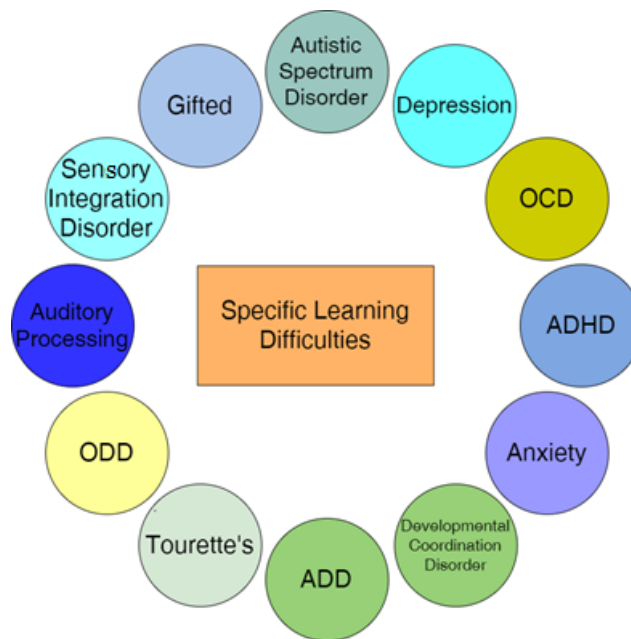


Figure 2 Learning Difficulties.

## 3 SITUATION DEPENDENT ELEMENTS

### 3.1 INTRA GROUP COMPATIBILITY

Personality differences can affect face-to-face collaboration and may lower trust in virtual teams. For relatively short-term assignments, personality matching could become a useful tool for effective team formulation.

In traditional work environments, the compatibility of individual personalities in a team can significantly affect collaboration. Every team member has his own personality, meaning that he or she has a different way of thinking, communicating, decision making, stress handling, and conflict management than other team members. When a team is created well, its members communicate better, have a more positive work environment, show stronger commitment and perform better. When personalities clash, there are tensions and conflict, and less team development. In online settings, where team members collaborate virtually, personality differences may, in fact, amplify barriers to building and maintaining trust.

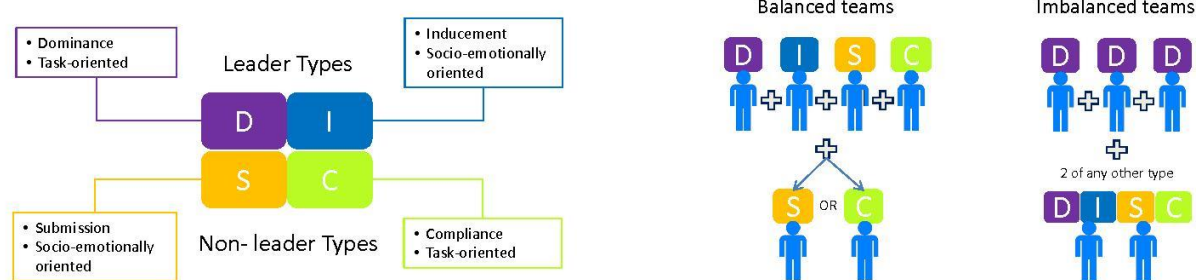


Figure 3 Personality Compatibility.

For relatively short-lived assignments, like those common in online crowdsourcing, personality profiling and matching could provide an effective strategy for the ultimate team formation. It is not clear how these traits affect the work environment, but test results show that balancing the number of leaders in a team and placing other roles as well, could significantly improve the end result, the communication, and the workers' mood, compared to teams that have a surplus of leader types.

According to the group discussions, it is found that there was conflict about who will coordinate the group and there was time wasted because of these oppositions. There was also a lot of tension and negativity in groups with imbalance of leadership where team members were unable to discuss their opinions and change their ideas.

Some researchers have identified five stages for effective team development, namely:

1. forming (team members meet for the first time, accompanied with uncertainty but also enthusiasm)
2. storming (members give different ideas and approaches, conflicts occur)
3. norming (conflicts lessen and the group finds its work norms)
4. performing (roles are clear, members perform their best) and

5. adjourning (group wraps-up its result, members part in friendly manner).

From these five stages, it was found that imbalanced groups only reached the 2nd stage. On the contrary, most Balanced groups reached the 5th stage and team members had positive feedback of their experience. [13]

### **3.2 PERSONALITY TRAITS AND ACADEMIC ACHIEVEMENT**

Personality traits also influence academic achievement. For instance, conscientiousness can affect exam performance and GPA. Combinations of Big Five traits have also been found to predict various educational outcomes.

Namely, conscientiousness and openness predict course performance, and agreeableness, conscientiousness, and openness predict overall academic performance. Extraversion, openness, and conscientiousness have also been found to predict GPA, especially when students apply previously accumulated knowledge to real life settings.

In contrast, neuroticism or emotional instability is negatively associated with academic achievement.

In addition to the Big Five, other traits such as grit or perseverance are also predictive of academic performance. Although these findings confirm the general significance of personality traits, there remains a need to examine other individual level factors such as students' learning styles. [10]

### **3.3 TEACHING STYLES**

When we are dealing with the learning situation, three aspects are of great importance to be considered, the students, the environment and the responsibility. Breaking down each aspect, we can have a more complete view on how a teacher can experience the classroom and create the ultimate learning experience for his/her students.

For the first aspect, which are the students, we can divide this topic in five elements that the teacher should notice. These are the nature of the subject, the students' intrinsic, the familiarity of the student with the concept, the attitude of the learner and the strategies used by the teacher during the learning procedure.

For the second aspect, the environment, three components can influence the learning experience. These are whether the teacher is having a self-centered approach to how all the students should learn the subject, how learners tackle the difficulties by socializing in the classroom and the ways the teacher can figure out the progress of the students.

The third aspect, responsibility, is divided in three counterparts, the organization and presentation of the subject, the cooperation of the student and the instructor when the student is dealing with difficulty to understand the subject and finally how the teacher can view the topic from the students' perspective. [16]

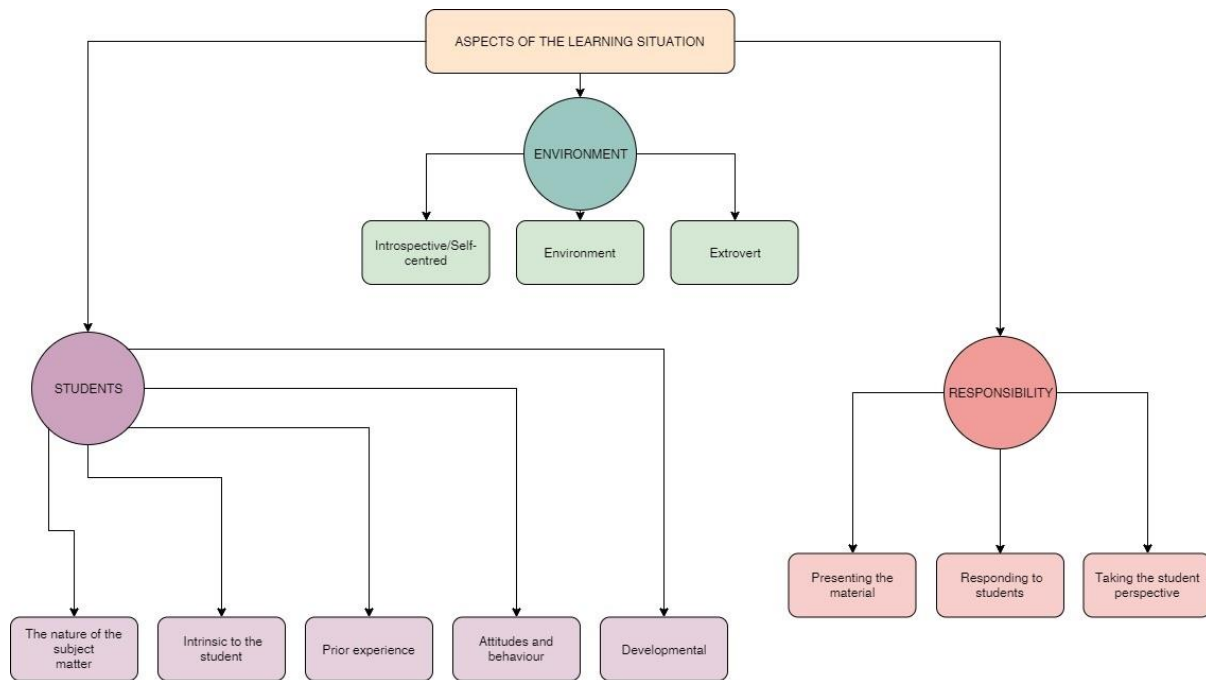


Figure 4 The Aspects of the Learning Situation.

Many approaches are tested to figure out what is the best practice to achieve best results in the classroom. The instructor, when communicating with his/her students has to adjust the learning techniques that matches to the classroom.

The teacher can alter the way a learner perceives the learning process, by changing his/her role, either as knowledge conveyor or as learning facilitator. On the first case, the students are expecting the teacher to give them solutions to their problems and on the other case, students are expected to reach to the solution themselves. In a classroom where the students are dependent on the teacher to give them the knowledge, the teacher takes responsibility for the progress of the classroom and the curriculum schedule. In the second case, although there will be mixed feedback from the students, learners are gaining experience by negotiating, searching for knowledge and communicating more. [4]



## 4 BRIDGING THE ABOVE

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### 4.1 LEARNING STYLES

In 1992 the Dutch psychologist Jan Vermunt published a dissertation study about the way university students learn, that received a lot of attention in the Dutch educational community. Vermunt refers to the way a student learns as a learning style. In literature, learning styles are very often considered as a kind of general strategy. Learning styles are also described as types of learning like, for example, concrete experience, reflective observation, abstract conceptualization and active experimentation, resulting in four learning styles:

1. divergers,
2. accommodators,
3. convergers
4. and assimilators,

as orientations like achieving, meaning, reproducing and non-academic, or as approaches to learning like surface, deep and achieving.

Elaborating on these theories, Vermunt describes the concept of a learning style as consisting of four aspects:

1. processing strategies,
2. regulation strategies,
3. mental models of learning
4. and learning orientations.

Processing strategies are thinking activities students use to process information in order to obtain certain learning results like, for example, knowing the most important points in the study material.

(Metacognitive) regulation strategies are activities students use to monitor, to plan and to control the processing strategies and their own learning processes.

Mental models of learning are conceptions and misconceptions students have about learning processes.

Learning orientations are personal aims, intentions, expectations, doubts, etcetera, students may experience during their educational career.

Vermunt (1992) distinguishes four different learning styles:

1. an undirected,
2. a reproduction directed,
3. an application directed
4. and a meaning directed learning style.

Students characterized by an undirected learning style have, for example, problems to process the material for study, experience difficulties with the amount of study material and with discriminating what is important and what is not.

Students with a reproduction directed learning style are characterized by study behaviour directed mainly at reproducing what is learnt at examinations, in order to pass these successfully.

Students with an application directed learning style try to employ what they learn to actual, real-world settings.

Finally, students with a meaning directed learning style wish to find out what is meant exactly in their study material, interrelate what they have learned and try in a critical sense to develop their own view.

To measure these learning styles, Vermunt developed the inventory of learning styles (ILS), a diagnostic instrument intended to measure aspects of study method, study motives and mental models about studying in higher education. With this questionnaire, it is possible to express each of the four styles in a single score. Students, therefore, show characteristics of each style but, as Vermunt assumes, one style dominates. [5]

## **4.2 LEARNING STYLES AND PERSONALITY**

Evidence suggests complex links between learning styles and personality traits.

For instance, relative to shallow processors, deep processors are more likely to use appropriate study methods, draw conclusions effectively, and have a stronger internal focus of control. Deep processors are also more likely to be conscientiousness, intellectually curious, extraverted, and emotionally stable. Finally, students who prefer a structured learning environment and intuitive processing are prone to anxiety and worry, whereas those preferring an activist and pragmatist style are more extraverted.

This means that learning styles and personality traits appear to be intricately connected, although it is not yet clear how they jointly influence academic achievement. [10]

## **4.3 LEARNING STYLES AND ACADEMIC ACHIEVEMENT**

Students differ in their preferred styles of thinking, processing information, and acquiring knowledge. Some select agentic styles, such as methodical study and fact retention, that are most suitable for obtaining higher grades, whereas others prefer reflective styles, such as synthesis-analysis and elaborative processing, that are conducive to greater understanding and knowledge. Some studies suggest that these individual differences in learning styles are affecting student performance. Overall, the most beneficial learning strategies to course performance and cumulative GPA include active thinking and organized studying, synthesis-analysis, deeper levels of reflection, and elaborative processing. Deep processors also seem to augment other benefits, such as a learning goal-orientation that is receptive to feedback and unintentional learning through the spontaneous absorption of material. Thus, prior research shows that students who are more thoughtful and analytical are more likely to perform well academically. Some have also suggested that matching learning styles to teaching methods increases academic achievement. This notion should be taken with caution, due to the fact that there is a lack of empirical support for the validity of tailoring teaching styles to students' learning styles. Considering that all humans have the potential to learn and have individual preferences for how they study, Pashler et al. emphasize investigating strategies that enhance learning and recall in general, as opposed to the matching of teaching techniques with specific learning styles. [10]

## 5 RELATED WORK

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Over the years, several attempts were conducted in order to implement innovative teaching and learning techniques both from the teacher's and from the learner's perspective. Many universities have designed and created e-learning platforms, forums, Massive Online Open Courses (MOOCs) and groups on Social Networking Sites (SNS) to achieve the ultimate learning and teaching experience.

An interesting example is the case of Universidad Central del Ecuador (UCE), where a "Virtual Educational Platform" was created to support the teaching-learning process. In this platform, the teacher was able to interfere during the teaching-learning process, to control the content and improve his/her teaching competencies. The findings of the usage of this tool are mentioned below.

- The students were happy with the fact that they could access the content any time
- The design of the tool received positive feedback, since it was similar to an already existing learning site and the users adapted easily to it
- Students utilized the forum and questionnaires more
- Teachers used not only the organizational tools for the courses and the tasks but also the classroom management tools
- There was a need for continuous training plans for the professors to delimit his/her role
- and finally, there was a question in how the resources were used in the platform. [6]

Another tool for learning is enrolling at Massive Online Open Courses (MOOCs). MOOCs are fairly new and students are not yet adapted to using them and staying focused on completing their courses. They have many positive impacts on the learning experience because of the convenient access. Some well-known MOOC platforms are Udacity, EdX and Coursera. To find out the reason of the loss of the motivation, a study was conducted, researching the behavioural motives of the users. The users were grouped in the following categories:

1. Viewers (they view lectures and solve few tasks)
2. Solvers (they view few lectures and solve most of the tasks)
3. Universals (they watch lectures and solve tasks)
4. Collectors (they download the lectures and perform tasks when available)
5. Observers (they enrol but they do not participate in any task)

The conclusion of the study mentioned above, was that most people were already familiar with online platforms. Before creating an online platform, the designer should consider creating an optimal design to make it more accessible and easier to understand for the users. This way the user tends to use all the features of the course, participate in more tasks and achieve better outcomes. [11]

At this point, it is important to find out the engagement score for online platforms in general and to define the ways online platforms are useful to teachers and students. It is important for learners to check on their engagement score and progress but teachers also can benefit from viewing the engagement score of their students. Engagement can be divided in three sub-dimensions, cognitive engagement, behavioural engagement and emotional engagement. First, cognitive engagement is defined as the attention the learner is paying and how he/she process the information he is given. Second, behavioural engagement is defined

as the effort, participation, and involvement of the learner when an assignment is given to him/her. Finally, emotional engagement is how much the student enjoyed the learning process. According to a research of the University of South Florida, online learning platforms provide two key functionalities, the tools and interfaces to create interventions and non-intrusive measurement techniques to measure the effect of those interventions. The suggestion was a content engagement score for any content as a function of user actions on the learning management platforms. The content on the platform could be multimedia, articles, resources, quiz, discussions, etc. User's actions were divided in three sub-dimensions that were mentioned above. The engagement score was measured as the sum of the scores of those three engagement categories. [20]

Last but not least, it is crucial to analyse how and when an online learning platform can be used, accepted and how useful it could become in the academic environment. Traditional U.S. universities devalue the use of online teaching tools. Most academics are against them, preferring former methods and tools, such as writing textbooks, advising their students while recognizing the fact that these methods do not offer the students the chance of making their own decisions.

In an anonymous survey, 232 academics of different scientific disciplines were asked about their opinions on the importance of developing online course material for their students. Results were not clear, since some of them were against and some of them were positive on the creation of online learning material. For a change to be possible, there has to be a unanimous commitment of the academic staff, or a great percentage of them being positive to commit. This ambiguous result leads the writer to the conclusion that unless universities and their teaching staff make big process on their opinion about new technologies and their value during teaching, it is impossible that they are going to utilize them in their lectures and classrooms. [19]

## **6 METHOD: USER REQUIREMENTS**

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To discover what happens in a Greek Educational Setting, students of the University of Peloponnese were asked to participate in a survey about online learning platforms. They were asked to elaborate their opinions about the courses that they expect to be included on the platform, about options and details on the functionality and there were numerous suggestions on the platform's design.

### **6.1 USERS**

The questionnaire was given to 13 students of the dept. of Informatics and Telecommunications. Ten of them were male and two of them were female. The majority of the participants was between 20 - 22 years old. All were already familiar with the idea of online learning and provided valuable insight in what a student expects to see in a learning platform.

### **6.2 INTERVIEWS**

The questionnaire's first question was about the device that the students prefer to use. While most students wanted the platform to be available on both desktop computers and smartphones, when they had to choose between a computer and a smartphone, the computer was the most popular device.

The second question was about the courses included on the platform. The majority of the contestants expected all courses to be included in the platform and some of them expected the courses that include group projects.

The next question was about the involvement of the teacher / professor. All students were positive about the professor's involvement in the learning process on the platform.

Next, the contestants were asked to determine the number of the group members. In this question most students preferred to choose according to the course, but when they had to give a number, the answers varied around 3 - 5 people.

There were some suggestions about the indication of the participation and engagement of the users in the platform. The ideas given were with scores, stars and voting. There were also some students that did not like the idea of rating the engagement of the users.

Another interesting topic that was asked was weather the users would have the option to choose their teammates or if the teams would form the best possible teams according to the user's profiles. Most of the students wanted to choose their teammates, but a lot of them wanted the teams to be created according to their abilities and personality traits.

The identification and the option to remain anonymous was another topic that the contestants were asked about. The most popular answers were the ability to choose if they would be anonymous or not and revealing their identity to the platform.

Last but not least, the students were asked to draw the layout of the website. The designs were simple and clear without too much information. Some of them had features like showing which users are online, calendars and organizers, announcement boards and chat rooms.

### 6.3 RESULTS

The results of this survey showed that online learning platforms have gained popularity on the academic setting. Many students have used online learning platforms, forums, MOOCs and SNSs for learning purposes. Learning platforms can implement the learning experience and offer a way to motivate students to study using many different learning techniques both in and out of the classroom.

Now it is time to check the results of the questionnaire in depth and understand the students' requirements better.

In this chart, it is shown that most students preferred the platform to be on desktops, but a great number of students answer that they would like the platform to be available on both desktops and smartphones. Only a few participants chose the smartphones as their preferred devices, because they stated that most students have a smartphone, while some do not have a computer.

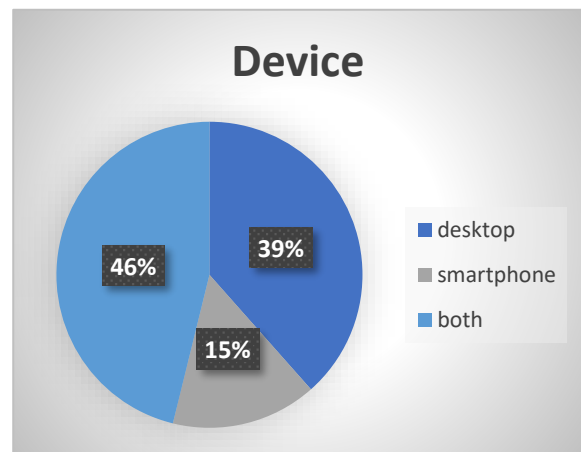


Figure 5 Preferred device chart.

When the students were asked whether the teachers were wanted in the platform or not, the answers were interesting. As it was clearly mentioned by the students, teachers are expected to monitor the content and to guide the students when necessary, with all of the students requiring the participation of a supervising teacher.

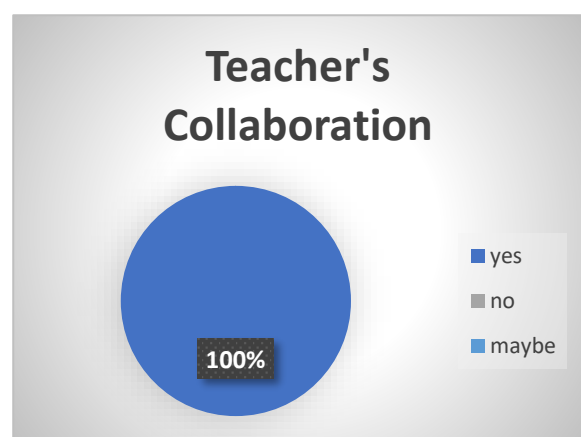


Figure 6 Supervisor's collaboration chart.

Next, the participants were questioned about which courses they would like to see in the platform. The majority of the participants expect all of the courses to be available on the platform, while some of them expect only the courses with collaborative exercises and projects to be included.

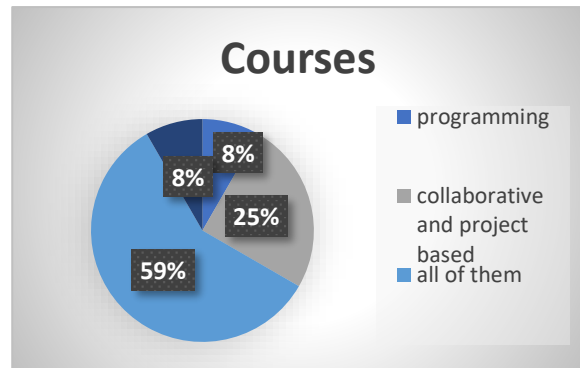


Figure 7 Courses chart.

In the following chart, students were asked to determine the number of students that could make the optimal team. In this question, there was a tie between 1 – 6 members and more than 5 members. Some participants did not answer, stating that there is a different number of members for each situation, and the students should have the ability to choose.

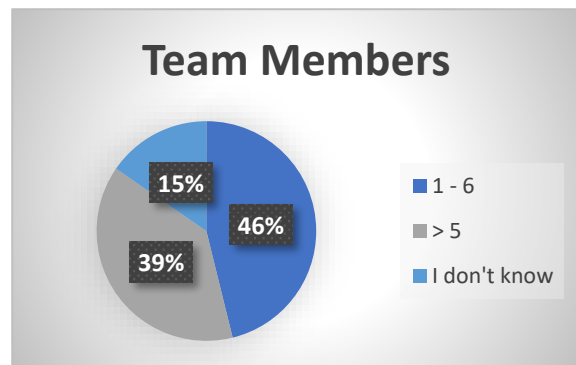


Figure 8 Team members chart.

Team matching is also a great option with some students wanting the platform to match them to their ideal groups according to their grades and personality, but the majority of the students prefer having the option of choosing their own teammates. Our theory that teams should be carefully created is validated by most students, noting that they need to have control on which people will be their teammates.

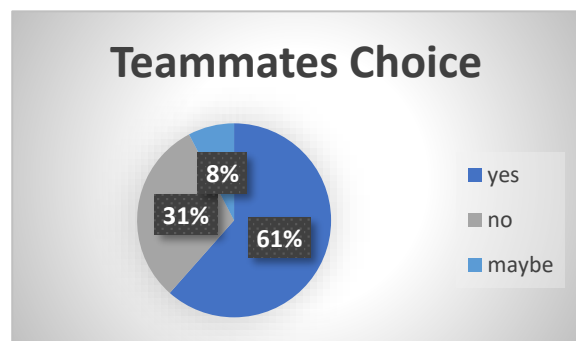


Figure 9 Teammate's choice chart.

Finally, the participants were asked if they would like the choice of anonymity in the platform, with most of them saying no, or that they would like to choose whether they would be anonymous or not. Some students suggested that each member should have an identification code to determine their online profile and only a few of them supported the idea of hiding their personal information.

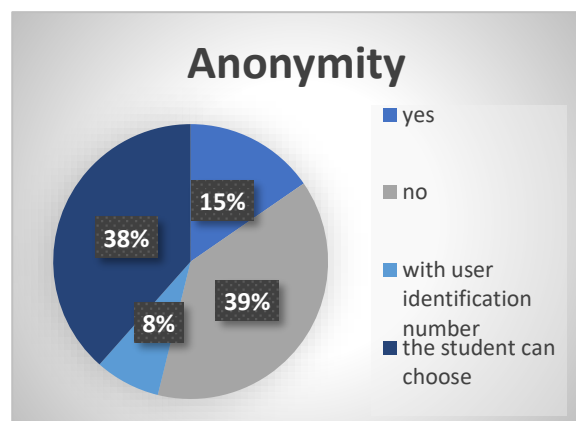


Figure 10 Anonymity chart.

## 7 CONCLUSIONS

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After considering the students' feedback on the platform, their opinion and expectations, it is shown that most students want to have the ability to choose how, when and for what reason they would use the platform. In every question about the platform's content or hardware, they wanted to be able to personalize their interaction with the platform and to adapt everything according to their needs or the course's content. From that, it is clear that the creator of an educational platform should investigate the students' and each subject's requirements before creating a platform. Students want to be able to choose their teammates, their device, their courses and how they will communicate with others. All students want a supervisor on the platform to check the content and guide them when it is necessary.



## 8 DISCUSSION

Learning and teaching is a compound experience, with teachers and learners searching for ways to make it more enjoyable and interesting. Online tools could solve this problem, but there are some issues that should be considered before designing an online platform to offer the best possible environment for the students. It is suggested that students should feel welcome, free to express their thoughts and to collaborate with others. They should be able to modify the design and the content to make it more welcoming and suitable for their needs and expectations. Anonymity is not something students are expecting as a feature, with most wanting to know with whom they are collaborating or talking with.

When answering the questionnaire, some students included some suggestions on the best designs for a learning-teaching platform, with many great ideas that could help in creating a great and helpful platform. There are some examples given below.

For desktops, most students preferred clean layouts with discrete boxes and menus.

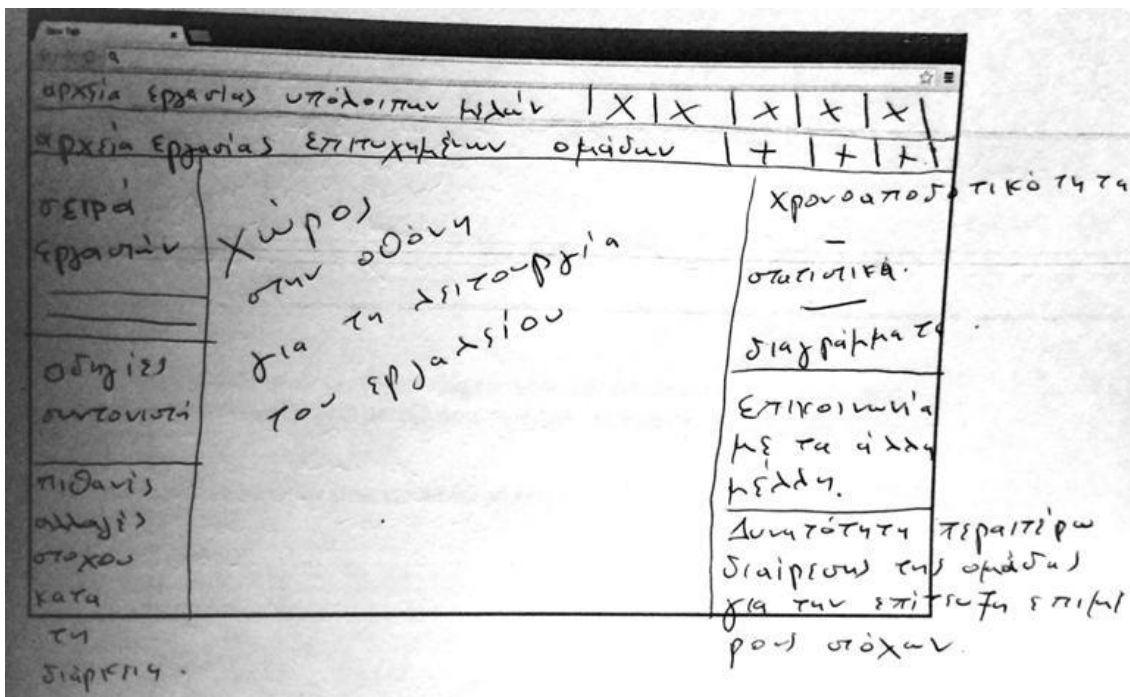


Figure 11 First Student's Desktop Design.

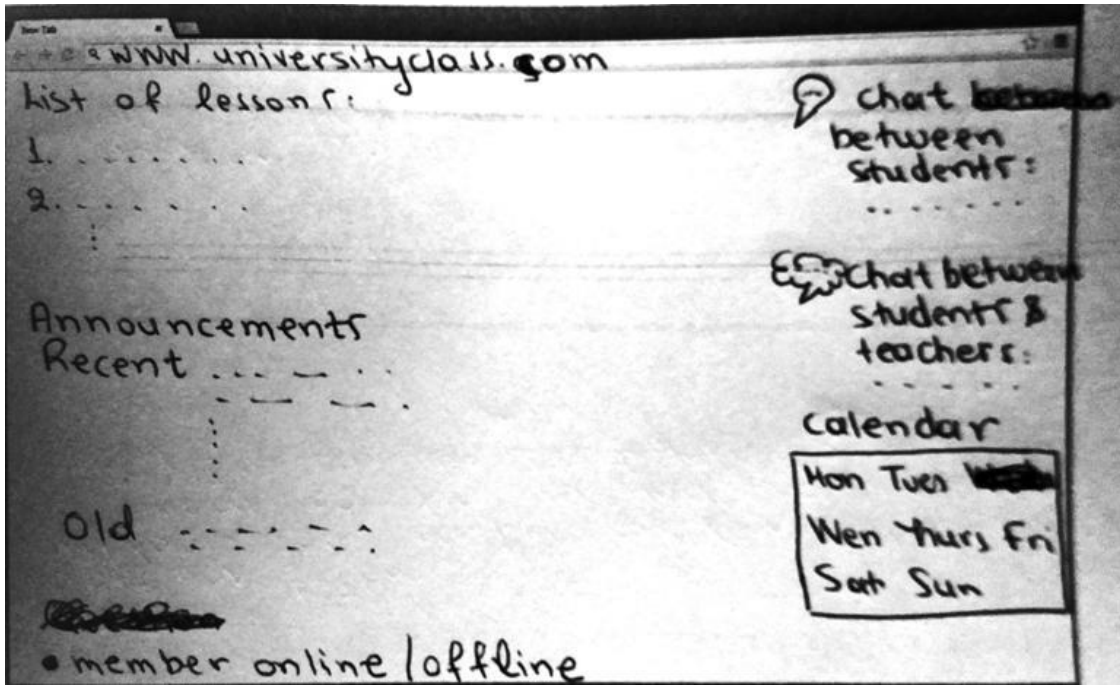


Figure 12 Second Student's Desktop Design.

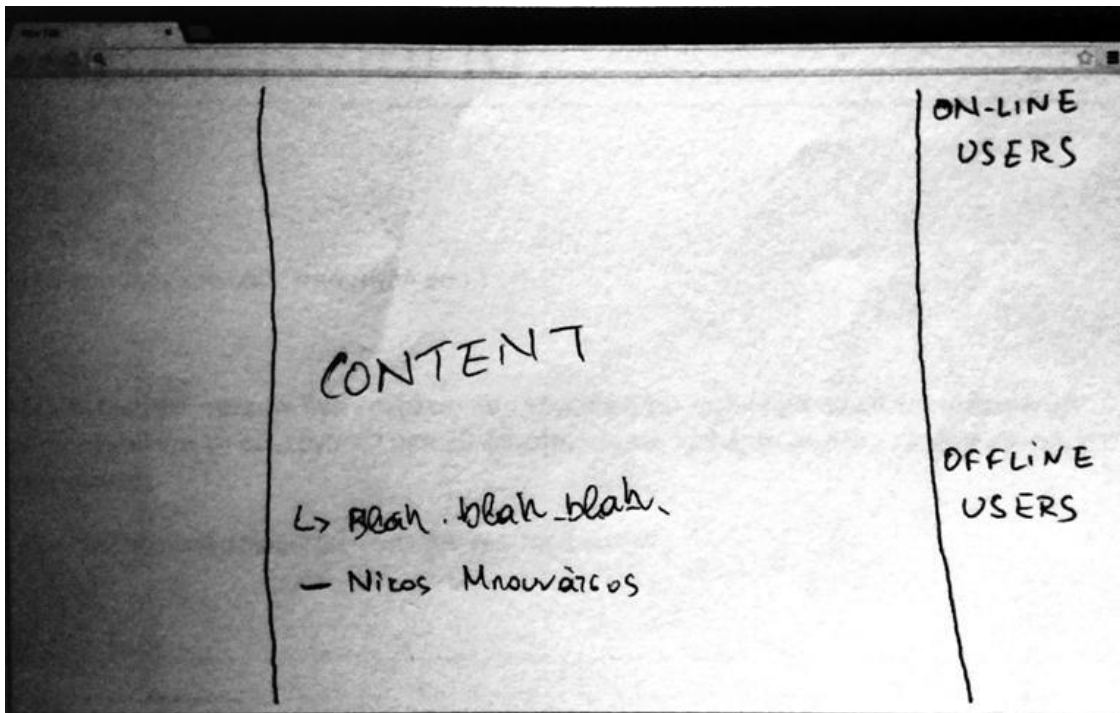


Figure 13 Third Student's Desktop Design.

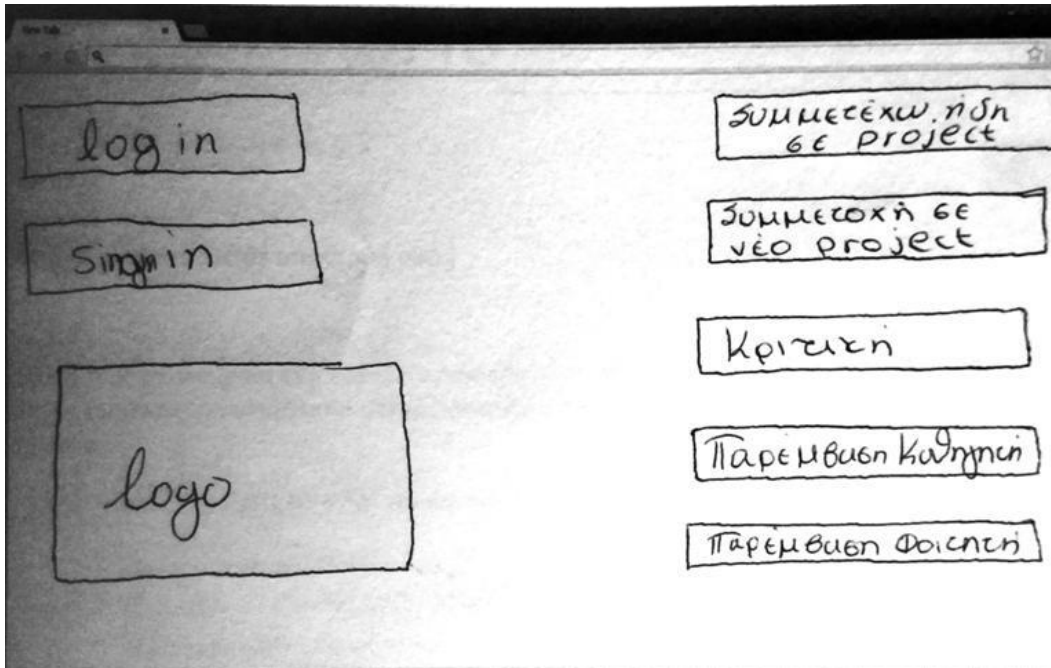


Figure 14 Fourth Student's Desktop Design.



Figure 15 Fifth Student's Desktop Design.

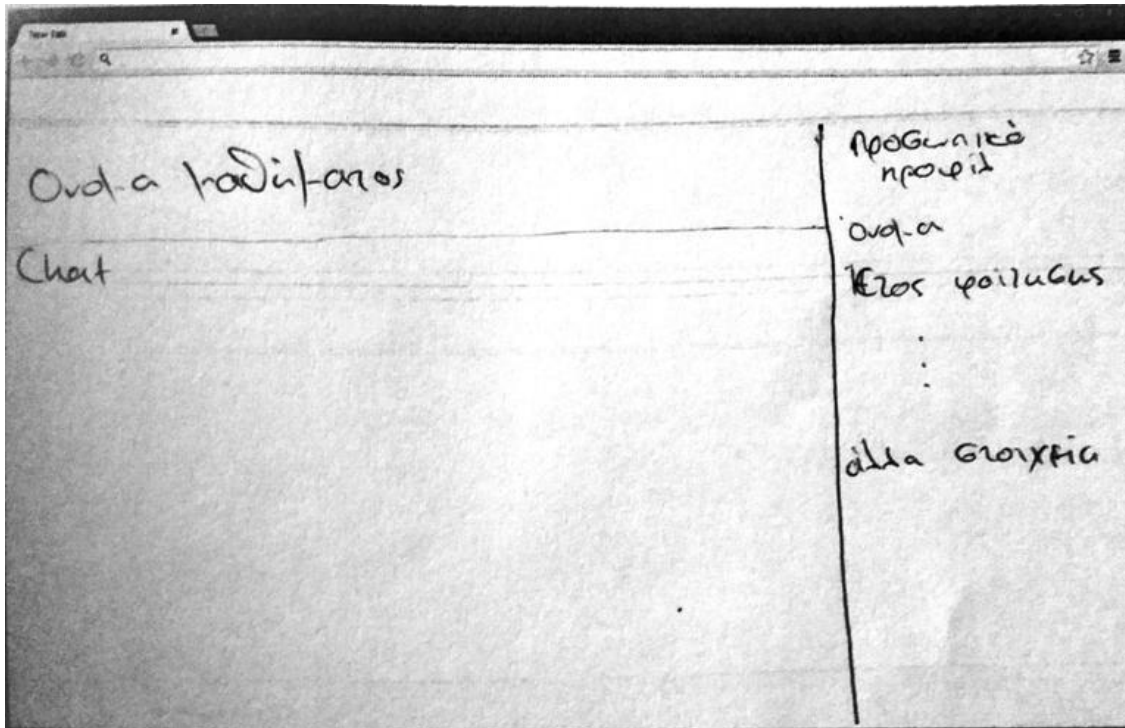


Figure 16 Sixth Student's Desktop Design.

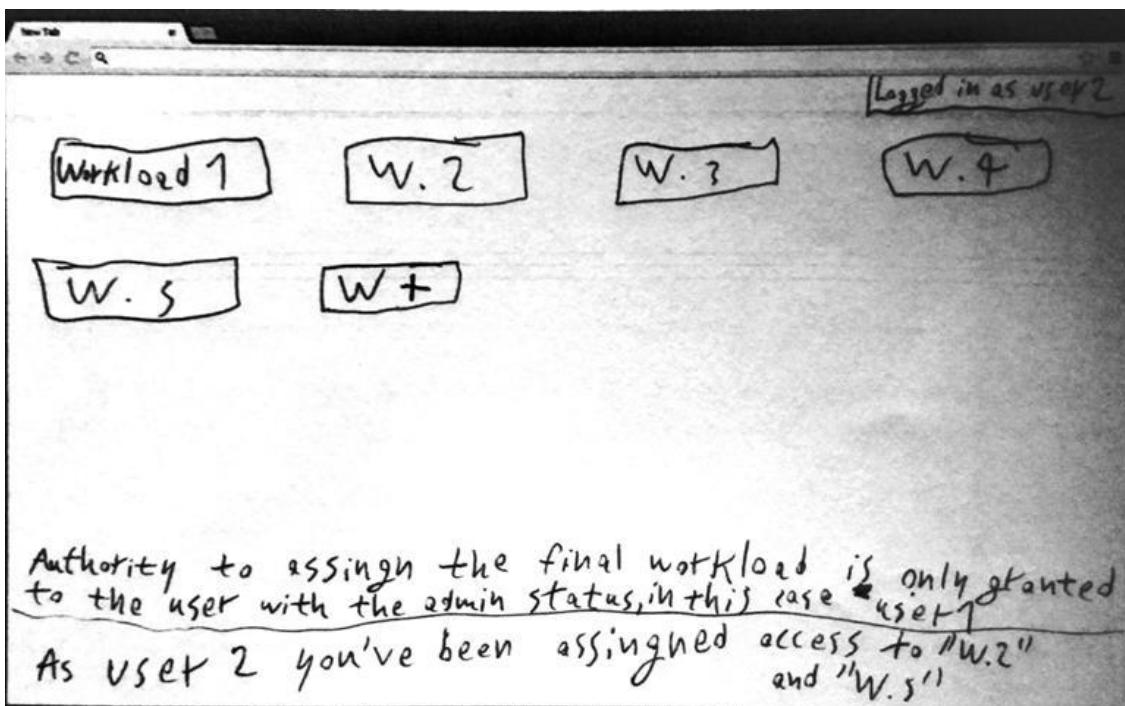


Figure 17 Seventh Student's Desktop Design.

The students have shown an interest in communication with their teammates through the platform and there were some designs where they included communication features with the teachers. Logging in and posting were common requests and there were some designs with organizing tools and calendars for time and task management.

The following segment will include the designs of the students for the educational application on smartphones.

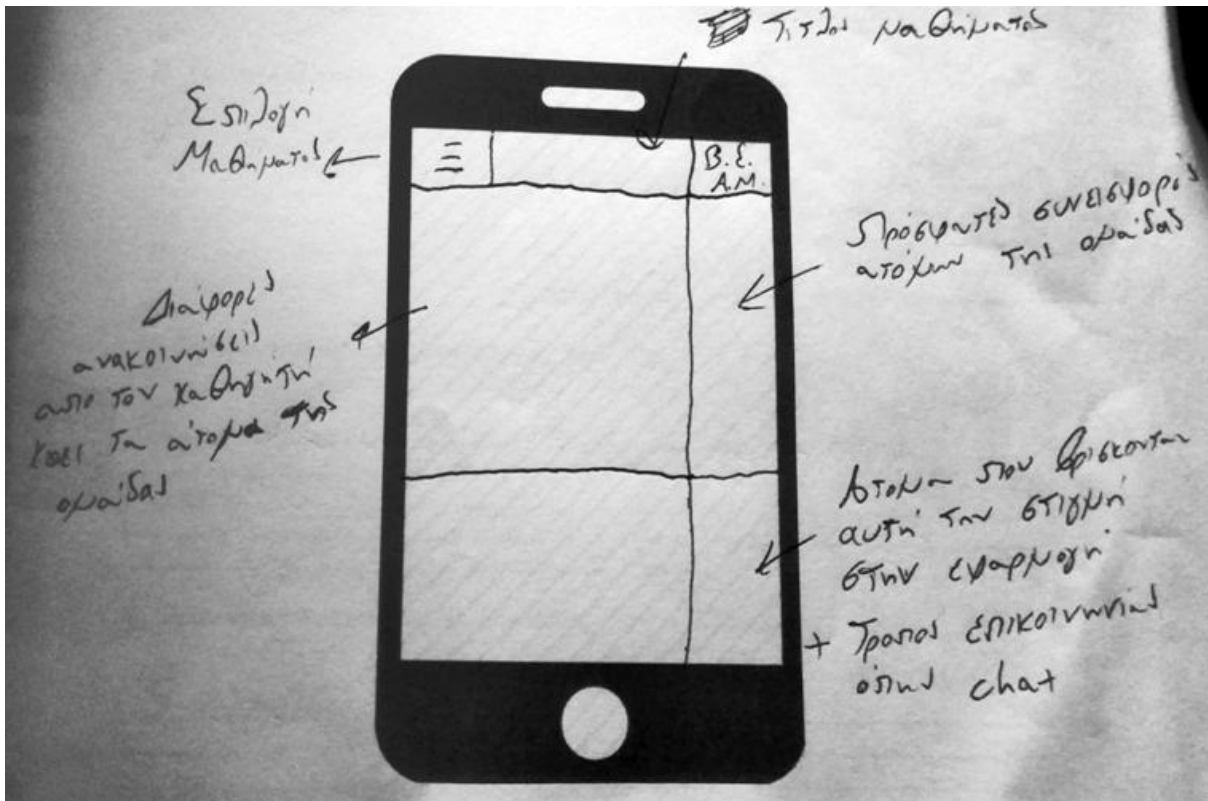


Figure 18 First Student's Smartphone Design.



Figure 19 Second Student's Smartphone Design.



Figure 20 Third Student's Smartphone Design.

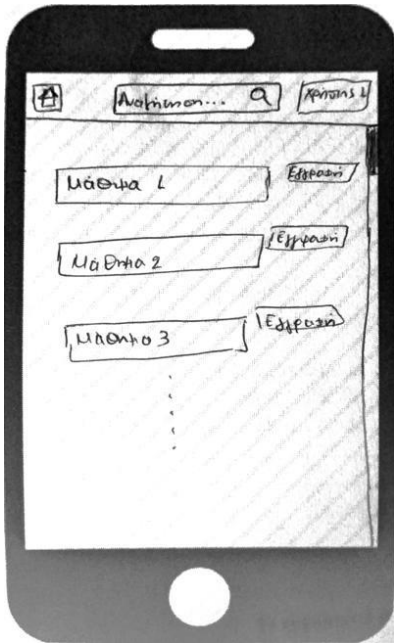


Figure 21 Fourth Student's Smartphone Design.

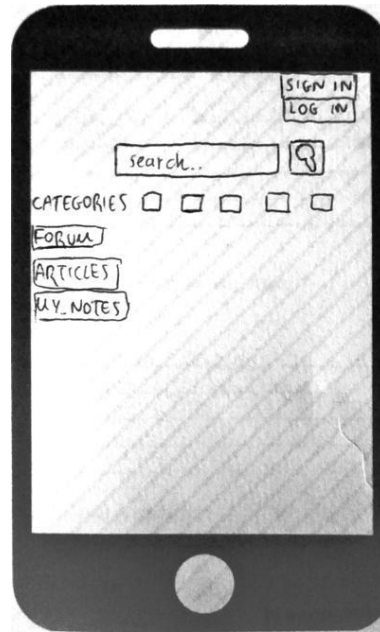


Figure 22 Fifth Student's Smartphone Design.

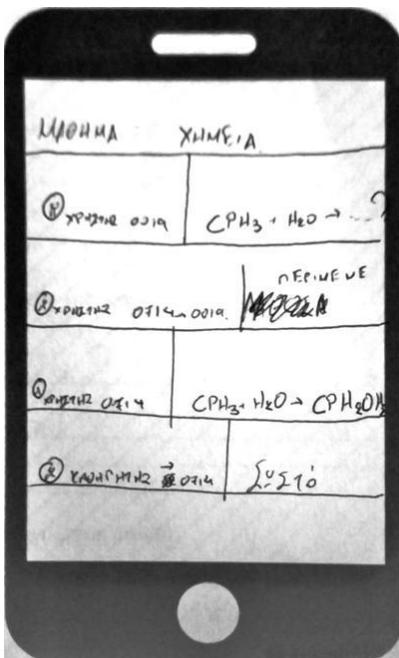


Figure 23 Sixth Student's Smartphone Design.



Figure 24 Seventh Student's Smartphone Design.

By noticing the designs for the smartphone devices, there is a similarity in the student's demand for simple and structured layouts. The main difference is that there is no chatroom, and communication features exist in only two designs as forums and group texting. The content of the smart device application is focused on the courses and on finding articles, projects and bibliography.

## 9 FUTURE WORK

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There are still important things to look into when a student is using an online learning platform. For instance, it is interesting to check the survey findings and see the student's responses when using an online learning platform and testing out if the survey results would match the reality. It would also be very interesting to see how many teachers are willing to use these tools, what they will use it for and how. This information will offer a better perspective from not only the student's but also from the teacher's side.

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