




Raising Students' Motivation in Terms of Blended Learning: The Example of Interface Design Mastering

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Abstract: The problems of raising students' motivation in terms of blended learning implementation at national universities are discussed in the paper in the context of interface design mastering by the students of various specialties. In the progress of work, there were analyzed the core features and challenges of blended learning, and covered the ways of enrichment of the blended learning techniques (flipped learning, gamification, digital storytelling, cooperative learning etc.) with interactive methods and forms of work. The experience of interactive methods practical realization in the process of the user interface design mastering by university students is presented. It is also covered the preparation stage of the survey on the estimation of the students' motivation. The survey was designed to evaluate whether the interactive methods introducing into the blended learning activities is in line with the aforementioned rules and detect what students' motivation levels are. The results of the survey, according to the levels of students' motivation are presented and discussed. The prospects of the research are outlined.


1 INTRODUCTION


According to recent studies, there is an increasing focus on the students' retention at university and accomplishing their higher education. For instance, the percentage of the university dropouts is pointed out as quite high (40% in USA, and about 10% in Europe) (Eur, 2023). Consequently, it raises the urgency of identifying factors that can cause decreasing the students' dropouts. Among the reasons for students leaving higher education (Bonfield et al., 2020; Eur, 2023; Hanson, 2022), there were identified some factors as affecting student's retention and their educational success: (1) trainee's characteristics including their motivation and cognitive abilities; (2) university surrounding comprising teaching quality, learning strategies and interactions with peers and educational staff; and (3) external factors connected with non-academic external problems (current job market situation, family responsibilities).


According to a psycho-educational dimension, motivation to learn is understood as a student's energy and drive to learn, work efficiently and realize their potential (Islam et al., 2018; Ibrahim and Nat, 2019). In numerous works motivation is considered as an important contributor to trainee's academic success and essential for their retention in higher education.

The issues of student's motivation boosting in terms of blended learning are widely discussed by the researchers. Especially urgent this problem is seen for the blended learning models with the focus on distant learning which are currently getting more common due to pandemic and war conflict situations. Despite the great advantages of the blended learning versus conventional classroom education, there are serious drawbacks and challenges of its successful implementation in the university studying pointed out by the researchers and practitioners.

In particular, it is stressed not satisfactory didactic and methodological provision in the context of current educational process. In addition, it is pointed out that in order to succeed, the correct blending of the conventional and online educational delivery needs to be realized. Conventional approaches to the learning

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aids creation, educational content design, and techniques of tutoring do not totally suit blended learning paradigm and do not enable to involve students properly into active learning process. One more problem in this context is associated with the fact that university curriculum is recently guided mostly by cognitive approaches rather than by motivation theory, therefore learners' motivation to study is undervalued (Islam et al., 2018; Ibrahim and Nat, 2019).

The said problems cause students' passive position at blended learning, lack of classroom atmosphere and interactivity, losing their cognitive interest, not satisfactory academic results, which finally leads to decreasing of students' motivation to master educational content and obtain top level professional expertise.

Thus, it is essential to find out the approaches to motivation boosting based on the involving students into the blended learning activities enriched with interactive methods.

The aim of the paper is to elaborate and cover the ways of raising students' motivation at blended learning and to probe them at user interface mastering in the progress of the university students' training.

2 THEORETICAL BACKGROUND

Theoretical framework of the research is made by the analysis of the (1) fundamentals of motivation theory; (2) main characteristics of blended learning and its typical learning techniques used in the practice of blended learning; (3) basic approaches to the mastering of the fundamentals of user interface design in the training of different specialists.

According to motivation theory and its educational dimensions, motivation to learn is defined as the personal efforts which encourage to learning activities, ensure their continuity and point direction to the activities with the aim at achievement of student's desired goals (Puspitasari, 2012). Learning motivation is seen as a psychological factor that plays a role in raising the spirit of learning for individuals. Motivation to learn is characterized as a drive of the tutorial process and significantly contributes to reaching the goal of taking the benefit from the learning, what is especially essential for professional university education.

It is also underlined by the researchers the tight connection between motivation and academic results of a student. It is recommended to analyze the factors which influence the learning outcomes in the context of learning motivation that is considered as a necessary requirement for studying, providing enthusiasm

in overcoming leaning difficulties (Alderfer, 1969). Some experts also look at learning motivation as at the student's eagerness to do the learning activities driven by the desire to achieve the best achievement and academic results (Sofyan and Uno, 2004).

According to Keller (Keller, 1987), the most common factors that affect motivation in the process of learning are: attention, appealing to learner's past experience, positive attitude, and satisfaction. It is argued that provision of all these ingredients may promote and sustain motivation throughout the learning process (Keller, 1987, 2010). It is also formulated core rules that have to be met in the progress of tutoring to provide these components (Huang and Hew, 2016).

According to the first rule, a variety of learning strategies should be implemented to attract and retain learners' attention. The second rule recommends to set clear instructional goals and provide learners with educational content which refers to learner's past experience (academic or working one). The third rule which is responsible for shaping student's confidence says that learning environment should promote learners' positive attitude to the tutoring process and suggest focusing towards success. According to the fourth rule, it is essential to help students gain satisfactory feeling.

It is also pointed out that on condition the first three rules are met, students' overall satisfaction will be enhanced accordingly (Keller and Kopp, 1987; Keller, 2010). According to studies (Petsche, 2009; Ormrod et al., 2019) motivation may have different kinds of influence on the student's learning and their behavior toward subjects mastering. For instance, the motivation can: (1) direct learner's behavior toward proper aims; (2) lead to increased effort and energy; (3) raise initiation and persistence in doing learning activities; (4) strengthen cognitive processes; (5) lead to better performance.

There are distinguished two kinds of learning motivation: internal and extrinsic motivation (Petsche, 2009; Ormrod et al., 2019).

Intrinsic motivation typically arises without obvious reward. As an own reward, a person takes accomplishing the task or achieving their goal. Internally motivated behavior is said to be natural, and is considered to result in creativity and flexibility, experience of interest and enjoyment, and in feelings of being competent and self-determined.

Extrinsic motivation arrives from the outside a learner, and is driven by the apparent rewards or reinforcements for learners to engage them in the activities. The motivational rewards may include verbal praise, higher points, special beiges that can lead

to academic privileges, certificates etc. The external motivation factors provide student's satisfaction and joy which the activity itself and their results may not give to a learner. Thus, it can be a challenge for educational staff to find out special stimulus as external motivation factors to provoke student's cognitive interest which can lead to raising his internal motivation and taking pleasure of learning activities and obtained results.

The process of students' motivating to learning is seen as a way of their encouraging to productive cognitive activities and active mastering of the educational content. This process has the features of a certain cycle which is repeated at each segment of learning on higher level. Therefore, educational staff have to provide each stage of motivational cycle with the help of special methods and techniques. Among them experts distinguish such stimulation techniques as communicative attack, suggestion, overcoming difficulties, positive expression shaping etc., and emphasize the increasing role of communication and interaction during learning. In particular, it is recommended to develop and apply the interactive forms of learning focused on the provoking students' cognitive interest and involving them into productive cognitive activities. In lots of works it is proved the connection of motivation with students' engagement and interactive strategies of learning which is coordinated perfectly well with the stimuli both for intrinsic and extrinsic motivation. It is pointed out, that interactive forms of learning are able to demonstrate students their personal role in common productive discussion, to make them understand the importance of their own contribution into common result, to feel pleasure of learning, which finally can influence on their learning motivation.

For successful blended learning implementation, the introducing of interactive methods is seen also beneficial (Vakaliuk et al., 2021; Vlasenko et al., 2021; Dellatola et al., 2020). Thus, it is possible to anticipate the positive impact of enrichment of blended learning techniques with different kinds of relevant interactivity on students' motivation.

Covering main characteristics of blended learning and current challenges of its implementation in national higher educational practice, we would like to emphasize the following aspects.

Blended learning is considered as a combination of face-to-face and virtual learning, when educational content is presented and worked out online but with some features of typical classroom studying. According to Wear and Levenson (Wear and Levenson, 2020), the core goal of the virtual learning is to provide the access to education with technology support

and enable a learner to achieve their personal educational targets. The final outcome of virtual learning is a distant learning provided by an online learning management system. These online systems enable trainees to get access to the necessary materials and trainers' responses at their outworking from any point with the Internet access. This model of blended learning is called online driver. However, it is concluded that the model is not effective enough, because the students' learning activity is not managed by the educational staff.

Researchers and practitioners find more appropriate for higher education two other blended learning models: flex model (mostly focuses on the online learning with trainers' support during online studies on a flexible basis) and rotation model (provides interchanging of in-person and online tutorial process). Their main benefits are sufficient levels of the control over the students' learning, and of flexibility, as the learners are provided with tailored learning techniques and platforms designed regarding blended learning strategy. In particular, the researchers and practitioners (Adel and Dayan, 2021; Wear and Levenson, 2020) point out that the learning systems in flex and rotation models are ought to be designed taking into account core features of the national educational systems, current peculiarities of tutoring process, trainees' needs etc.

In this connection, it is also emphasized that within any model of blended learning, it is essential to pick up proper learning techniques, which causes necessity to analyze common ones, available in the practice of blended learning. There are described some attempts to create the system of blended learning activities which might provide trainees with a total learning model, successfully using digital technologies and blending them with conventional learning techniques (Wear and Levenson, 2020). In the terms of blended learning, in particular, it is pointed out the benefit of using the system of the learning methodologies such as flipped learning approach, gamification strategy, digital storytelling, team work, cooperative learning and others. However, other researchers argue that these kinds of learning activity systems are not efficient enough for students' motivation raising, and must be improved in the lines of attracting rather interactive methods into said blended learning techniques regarding the challenges in terms of efficient communication (Dellatola et al., 2020).

Among the influential factors of successful elaboration of blended learning in higher education, it is also relevant to include the factor of regarding the specifics of the subject area and the features of exact academic subject due to the great variety of majors

and difference of the curriculum disciplines. Therefore, the blended learning of the specific subject has to involve the trainees into special kinds of learning activities which are able to influence on their motivation to master exactly this subject domain and for the trainees of the exact major. The said learning activities must be selected in accordance with the proper educational content, also designed regarding the peculiarities of training the specific pre-service specialists.

Here we would like to cover authors' approaches to the mastering of the fundamentals of user interface design in the training of different specialists, partially based on our previous works (Bilousova et al., 2021b,a).

The focus on the educational challenges in this field is caused by the evidence of the national course on the digitalization of economy which raises the urgency of the training high level specialists in different areas who have advanced digital skills. Among such skills there is a competence in the field of user interface and user experience design (UI/UX design) which is essential today for a wide range of professionals from pure IT specialists to the experts in digital products development, marketing and human-computer interaction.

In our earlier works we presented special approach to the curriculum building for students' training in this area which was elaborated with understanding that UI/UX design is complicated subject domain that integrates the set of related areas, like graphical design, software development, digital products promotion, psychology, engineering, ergonomics and others. Thus, a designer is expected to master special inter-discipline knowledge and skills.

Characterizing our approach to the curriculum and educational content building for potential specialists' learning of the basics of UI/UX design, we would point out that it was also created based on the analysis of the essence of the UI/UX design and role of its mastering in the vocational training of different specialists.

In fact, the UI design rather focuses on the product appearance and supplies exactly interaction functions (Bilousova et al., 2021b). UI design is developed on some core regulations shaped regarding mostly the psychological features of the human perception of information, influence of visual language on this process, peculiarities of human interaction with devices and their software (Mikhnova, 2019). UX design differs from UI type of design. It is understood by the experts as a tool for provision of the best user's impression, practice and satisfaction of the interaction with the product of any kind (Platonova, 2019). It rests

on the deep understanding of the user's profile, their needs and requirements; functionality of the product; possible user's behavior etc.

However, the both types of design are two sides of the same process and serve the same purpose of the best final marketing result, using different means. Hence, the mastering of the UI/UX fundamentals by the students of different branches should rest on understanding of some unique postulates and common instruments, and at the same time reflect the state-of-art tendencies in design shaped in different branches.

Thus, it was offered the practically-driven approach to the building of educational content for learning of UI/UX design basics which expects separation of the two parts (stable and varying) in the curriculum of the potential specialists' training.

The stable part includes the modules covering general fundamentals of the design that rest on common principles and must be mastered by the designers in any sphere. It was justified (Bilousova et al., 2021b) the structure and content of three academic modules of the stable part of the curriculum. The first module "Psychological base of visual perception" is aimed at forming the students' knowledge for realizing the psychological mechanisms and features of visual information perception. In addition, in the module it is discussed widely the psychological significance of the graphical image semantics due to the involvement of various information channels (logical, aesthetic, semantic) and their roles in the shaping of visual image in human mind (Mikhnova, 2019; Platonova, 2019).

Next module "Graphic interface design" of the stable part is dedicated to mastering basics of the graphical interface creation based on the principles of visual language application. Here it is learnt how to create and render the interface ideas using colors, typography, imagery, bootstraps etc., how to add visual anchors, and how to make interface function smoothly and in user-centric way. Thus, the module gives the trainees understanding of the peculiarities of both types of design and at the same time, their joint role in the successful interface creation. The final module "Tools for interface design" of the stable part of the UI/UX design university curriculum is expected to focus on practical work in one of the common environments (for example, in Figma) for the interface development. In fact, Figma is known an online design tool which enables to make mockups, interactive animations, and efficient apps prototypes (Bilousova et al., 2021b; Mikhnova, 2019). Figma environment also arranges version control, joint work opportunities, code generation and other essential features. In such a way, regarding Figma facilities, the process of

the clickable prototype design is greatly coordinated with the multi-step process towards the software development, demonstrating the role of both UI and UX design at each stage of this practice. This promotes cultivating of the best experience for potential designers in any sphere. Thus, Figma is seen to be a state-of-art universal instrument of a designer and it is really beneficial for the trainees of different majors to master basics of UI/UX design on Figma platform. Finally, resting on the psychological knowledge and design skills obtained in the previous modules, the students will apply this methodology within the third module to produce a digital prototypes of their apps, working out the UI/UX design mastery.

The stable part of the UI/UX design curriculum of the potential specialists' training, according to our approach to the building of educational content, must be extended by the modules of varying part. They are recommended to concentrate on the learning other special tools appropriate for solving interface design problems in different subject domains including the facilities of a number of environments (such as Adobe Photoshop, Adobe XD, InVision, Sketch, Adobe Illustrator etc.) (Bilousova et al., 2021b).

Thus, the theoretical framework depicted above served a basis for our research covered in the following up chapters.

3 RESULTS AND DISCUSSION

3.1 The Ways of Enrichment of the Blended Learning Techniques with Interactive Methods

Basing on the provided theoretical framework, we are going to present distinguished learning methodologies (flipped learning approach, gamification strategy, digital storytelling, cooperative learning etc.) within the flex model of blended learning, and to offer the ways how to enrich them with interactive methods, which can make them more efficient in terms of improving students' motivation.

Flipped learning is seen by researchers as an educational approach where the conventional outlook of classroom-based studying is inverted in the lines of offering trainees to master the certain educational content before the classroom time (Dellatola et al., 2020). Therefore, the learners come to class being ready to discuss the familiar content with their peers and teacher that enables extended understanding through debating and problem-solving activities arranged by the educational staff. In terms of blended

learning, flipped classroom seems to be commonly applicable and organic. Nevertheless, its implementation takes special teacher's efforts to arrange and facilitate students' interaction (discussion, efficient feedback, collaborative problem-solving, etc.) during online classes on the interface design mastering.

Different productive methodology which is available in blended learning is gamification strategy that allows to apply game-playing practices used in non-game contexts. It is emphasized, that attracting game elements into educational area provokes students' essential needs for their motivation (in particular, the needs to communicate, interact and cooperate with others, to feel own expertise in a certain area, and to control their own actions). According to studies, gamification techniques implementation is able to promote collaboration and raise communication, which is significantly important for flex model of blended learning. Some researchers also emphasize the essential feature of the strategy to apply game-based mechanisms and game thinking to diversify learning, to raise students' eagerness to study, and solve offered non-conventional problems (Zainuddin et al., 2020).

Besides the common application of the gamification methodology, for blended learning there might be also beneficial to use a gamification variant in the lines of the encouraging students to design a gamified product. Such an activity enables to trigger off gamification mechanisms, on condition of having enough importance for the trainees, involved into the creation of the gamified product, which can stimulate their sense of discovery and encourage them to master challenging material to develop a good product. At the same time, according to the theoretical background of the gamified products development (Dichev and Dicheva, 2017), the trainees have to follow some principles which are significant in the context of the user interface design mastering. In particular, it is essential for a potential user of the gamified product to feel that the game has a feasible goal exactly for him. Therefore, the product must have clear reward system and demonstrate individual user's progress along with its identification within other players who try to achieve the same target. It should make both competition and a feeling of belonging to a similar minded community. In addition, it is necessary to mind at the design of a gamified product that its main aim is to stimulate users to play the game trying to overcome difficulties in order to raise their scores. Thus, gamification strategy using in blended mastering of user interface design may be beneficial on condition of its didactically correct application.

Besides flipped learning and gamification strategies, it is also recommended to apply digital sto-

rytelling as a productive blended learning technique. Digital storytelling is understood as a practice when people apply digital tools to tell and share their narratives which have a special purpose and devoted to important topic, presented in emotional way, and can be interactive. A digital story can be determined as a multimedia presentation that comprises a variety of digital components to convey the target audience a narrative. Besides, digital narratives may be presented as web-based stories, interactive stories, narrative computer games and other types of multimedia products (Rutta et al., 2021).

According to studies and evidence (Rutta et al., 2021; Sagri et al., 2018), the digital storytelling approach has also been introduced in education. Merging images, sounds and plot within digital story enables to reinforce concepts being appropriate to different learning types of trainees. It is pointed out that digital storytelling can be used by educators with different didactic purposes: to introduce new learning material, to facilitate its discussion by students, to help them get a deeper understanding of complicated concepts etc.

In addition, students can be also encouraged to create their own digital stories devoted to some learning elements and pursuer a certain pedagogical aim. Such learning activity can provide important benefits for the students. Through the stories making they have to analyze, synthesize, and finally to take ownership of the information they are presenting. These things provoke higher-level thinking and raise responsibility. In this context, comic-based digital storytelling can play significant role. In particular, it is underlined that student-generated comic-based digital story is a learning technique when trainees create personalized comics to achieve a didactic purpose. This activity can facilitate mastering difficult (or controversial) academic material and work out their research skills. Finally, created by the students digital stories of any type may be used as efficient learning aids and curricular resources.

Among different activities applicable to blended learning, group work plays special role. Group work (or cooperative learning) is characterized as an instructional strategy when groups of trainees work together upon a common assignment. Usually, each group participant is individually responsible for a part of the task and has to contribute into the common result. There are some key points which ensure the success of the group work: students should feel responsibility for their share of work and interdependence on the results of other peers; the group should be accountable for achieving its goal; face-to-face students' interaction and mutual support; group partici-

pants should obtain instructions in the interpersonal, social, and collaborative skills necessary to work with others.

It is clear that some of the mentioned key points are really challenging in terms of their realization at blended learning. Some challenges also include assessing of the each person's contribution, resolving conflicts etc., which demands development of special learning strategies. Carefully prepared activities can help students obtain the skills to work together successfully, structured discussion and reflection on group work can predict and avoid some problems.

Thus, as it was mentioned above, the discussed kinds of blended learning activities should be innovated with the help of introducing interactive methods of learning to raise the level and quality of communication. According to Edgar Dale's cone of experience, we can conclude in favor of interactive methods, that after two weeks we tend to remember 50% of the material that we see and hear (option of passive learning) and up to 90% of what we say and do ourselves (option of active learning) (Dellatola et al., 2020).

In contrast to just active learning, interactive approach provides trainees' interaction not only with the teacher but with each other as well. It is characterized by the researchers as a form of learning and communicative activities in which trainees are involved into contemplation on their own knowledge, estimation of their own abilities, skills etc. in comparing with their peers. Teacher's role changes drastically, as the interactive learning concentrates rather on the trainees' interests, needs, and abilities. Learners become active participants of the tutoring process and not only perceive information. Being engaged by the learning activity and based on their experience, students have to activate their knowledge and abilities, earn new skills, shape their attitude towards learnt material, and express their opinions.

The teacher's mission in interactive learning is shifted towards achieving the students' goals. The teacher has to arrange interactive forms of work and tasks, working upon which students receive new information, and an individual assignment is transformed into a group task where each member of the group contributes to the whole group's success.

Some basic types of interactivity are distinguished by the researchers: (1) individual interaction of the trainee and the learning content; (2) interaction between the trainee and the teacher who encourages trainee's motivation via offering them exciting learning material and stimulating to apply knowledge for solving specific tasks; (3) interaction between peers and teacher that expects involving the students into the interaction among themselves, an individual

trainee with other students in the group (with or without the teacher) (Dellatola et al., 2020).

The last type of interaction seems to give the highest degree of the students' involvement in to the learning activity, which may cause the raise of the students' motivation to the subject learning. However, it is expected to be the most challenging to achieve, especially in terms of blended learning focused on remote mode. Thus, it is essential to apply certain interactive teaching methods that can guarantee efficient involvement of students in the interactive learning process. In fact, there is no general classification of such methods. However, it is possible to distinguish some of them which have special meaning in the context of their using in terms of blended learning in higher education. These methods may include lectures of selected kinds (inquiry-based, with deliberate errors, with the analysis of the specific situation etc.); game methods (business games, imitations, role-playing); debate methods (mini-conferences, seminars, Socratic dialogue, case studies); group solution method; project making.

3.2 Probation in Terms of User Interface Design Mastering

This subsection intends to demonstrate how the said activities (flipped learning, gamification, storytelling etc.) were enhanced with interactive methods in the process of blended learning of the course "User interface design basics" within the curriculum modules presented above in the progress of training of the university students' of different specialties.

Blended learning was implemented in its flex model when all the course materials were available for the students on the distant learning platform and there were delivered online (via Zoom, Google Meet etc.) lectures and practical studies according to common schedule including online consultations.

In the progress of going through the first course module dedicated to psychological fundamentals of visual perception that makes essential basis for user interface design there were applied mostly flipped learning and gamification strategies which were enhanced by different interactive methods.

For example, one of the flipped learning lectures on the topic of psychological mechanisms of data perception was held as an online mini-conference. There were assigned (in advance) different tasks to the pairs of students to learn proper theoretical material on the features of different data perception, to find out proper examples which illustrate peculiarities of human vision and their connection with interface design, and to elaborate presentation to take part in the mini-

conference both as presenters and listeners.

For instance, one of the students' pairs had to learn physiological background of human perception of printed information. The students worked independently with digital sources to understand how our velocity of reading depends on the number of characters available for perception by our vision, and how this feature can be accounted at the interface design. During the flipped learning lecture held in the form of online mini-conference which aimed at the exchange of results of the tasks assigned to different pairs of students, this pair gave a presentation on the results of their findings. In particular, they explained that the efficiency of reading depends in linear way on the amount of characters visible by eyes, and covered the reason of this fact based on psychological underlying of human eyes' parabolic movements similar to discrete leaps between words during reading. They also attracted the listeners' attention to the paradox of this cognitive and psychological phenomena, because despite their non-smooth nature, our eyes jumps improve our reading abilities, as we use the sense of skipped adjacent context to decrease the time of our comprehension of the read information.

The rest of the students who were listeners at the moment, were encouraged by the presenters and the teacher to discuss the connection of these findings with the problems of efficient interface. In particular, the listeners were attracted to speculation and making conclusions on the (1) efficiency of perception of isolated words and words connected into the long phrase; (2) the difference between task-driven and content-driven user interface; (3) the dependence of the efficiency of text comprehension in these types of interface; (4) the typographic decision-making at the interface design etc. In the end, the students-presenters supported the prepared discussion with the visual examples of the both types of user interface illustrating fruitful and non-fruitful using of these psychological peculiarities.

In similar way there was also arranged presentations of the results of the flipped learning tasks by the rest of the students' pairs with involvement other listeners into similar interactive debates. The group solutions finding during these mini-conferences within the first module were productively used by the students while their mastering subsequent modules.

For instance, in the progress of the interface design of potential web-application prototypes worked out at the workshops of the second module, there was used specially created interactive card game, focused on the involving the trainees in the analysis of applying various psychological techniques. Original card deck Mental Notes, suggested by Anderson (Ander-

son, 2009) presents over 50 insights from psychology, and can be used as an efficient brainstorming tool. Each card depicts an insight into human behavior and represents ways to apply this one to the user interface design. Selected samples of digital cards with insights are presented in figure 1.

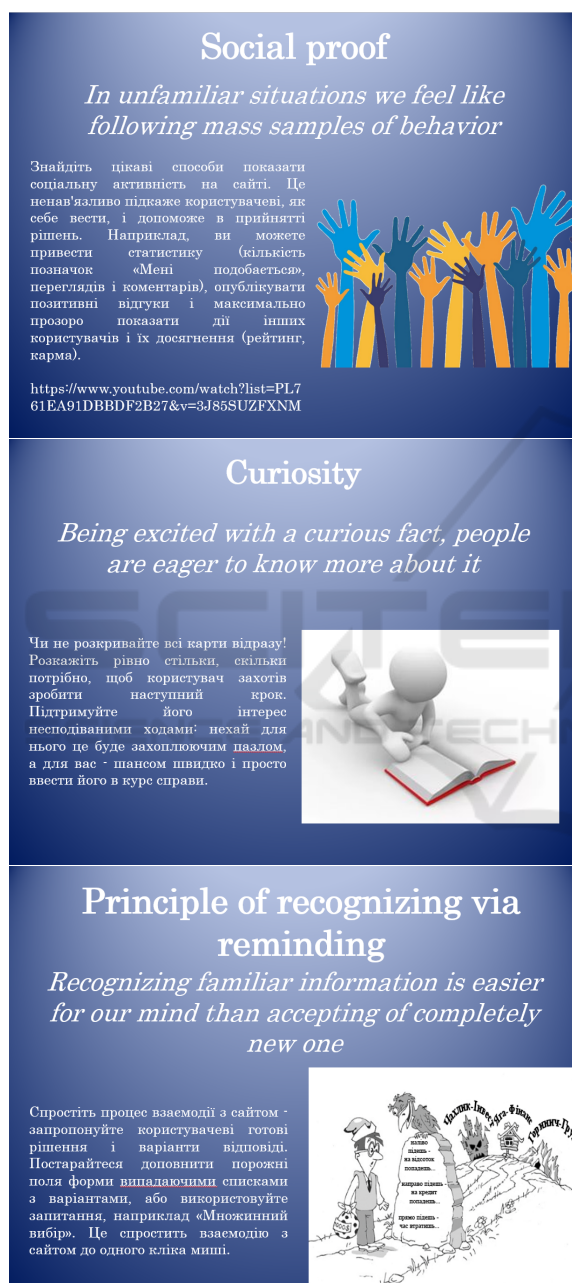


Figure 1: Selected samples of digital cards with insights into human behavior, representing the ways how to apply them to the user interface design.

The original card deck was transformed into interactive didactic game with digital “cards” and was

virtually played during online workshop. At the initial stage of the game the students were assigned the topics of their potential web-application to speculate over its probable users, their targets, tasks, application functions etc. As the game starts, the participants “choose” in turn a card from the deck, which presents a psychological technique (insight) used in the current practice of user interface design such insights as: curiosity, social proof, reciprocity, regularity establishing and others.

The participants (individually or in pairs) analyze the insight presented in the card, then they explain and prove their decision as for how they can use this insight at the interface design of their potential application: which elements of visual language and how it is relevant to apply; what means of typography, color, and graphical images and why will be right to use; the insight is going (or is not going) to be successful exactly for their application, according to the results of their initial speculations. The rest of the players are involved by the teacher into active discussion of the presented solutions and into collective decision making.

In terms of motivation raising, such a game playing provoked students’ cognitive interest to the topic; facilitated their understanding of effective psychological techniques and benefits of their using in interface design; promoted fluent communication on the professional topic, which finally led to joy feelings of the students and motivated them to be active participant of the tutorial process.

After the game the trainees may use the whole deck of the mental cards with variety of psychological techniques. As a game extension, the students are encouraged to apply at least five of the insights in the design of their interface prototype with their sequential presentations for the group.

In addition, the whole tutorial process on interface design mastering was immersed into the game online environment Classcraft, which enabled us to apply successfully gamification strategy. The environment allows to maintain gamification approach during any academic period, and encourages a trainee to go through the course sections individually or within the group, solving practical tasks, tests, and quests, deliberately created by the teacher for all the course modules, and earning game bonuses of different kinds.

In order to add interactivity into this gamified blended learning, we arranged the role playing game within Classcraft and involved individual students into the team role game, when each student should choose a character (a role of a Wizard, Warrior, Healer etc.) with proper skills, and cooperatively learn a topic via doing quests. The quests were prepared re-

garding the educational content and didactic purpose of the module.

For example, during the work within the second module "Graphic interface design" there were prepared the quests on the number of topics. One of them was the quest "Brief creation for UI design" which encouraged students to go through some quest stations. To overcome "Avatar" station, it was necessary to identify a character (in fact, a potential user) who is a target audience for the designing interface. The second station "Competitors" involved the students into analysis of the possible competitors of the interface design for potential user and sphere of their activity. Next quest station expected students to develop a chart of basic use cases for the developing interface. The final quest station "Visualization" encouraged students into determination of proper color palette and fonts as well as into picking up certain tools for the realization of different stages of the interface design regarding the analysis results obtained in previous quest stations.

At each quest station the students received specified tasks with exact scheme of actions. For example, at "Competitors" station (figure 2) the trainees' were focused on the analysis of strong and weak points of the competitors' interface design with subsequent concentration on successful and non-fruitful design solutions which led students to their unique design outlook for the identified user.

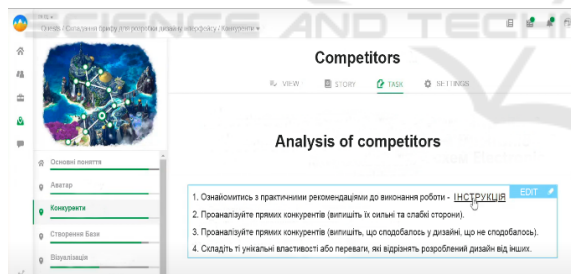


Figure 2: The episode of work at the quest station "Competitors" in the team game "Brief creation for UI design".

While overcoming the learning quests in the team, each participant used their skills according to their role and tried to contribute the best into the common results, doing quest tasks and earning different bonuses (Experience Points, Gold Pieces, Crystals, and Health) which gave them various additional opportunities and helped their team to achieve best learning results in the most effective way. Thus, the awareness of their personal responsibility for the team final success definitely raised the students' motivation to learn more and contribute more to feel the pride of the common academic result.

The trainees were also encouraged to solve the

Boss Battles tests in the Classcraft game environment with the option of both individual and team work, which is the most beneficial in terms of raising motivation at blended learning. Doing the tests by the whole team prompted the students' interactivity, as only the joint and well thought efforts of each participant could bring the success to the team. In addition, Boss Battles option enables team members to give and get mutual help while test doing, which raised common responsibility and team spirit.

On the Classcraft gamified platform it was also organized students' group work upon real-life tasks. For instance, within the third module focused on mastering Figma tools for interface design, the students were assigned to build a dynamic prototype of the site with landing pages in Figma environment. The full assignment was formulated as follows.

Let us imagine, that you are a marketing director of a company which is a new player in the coffee trade market. The company buy coffee beans from Latin America, fry, blend, and mix them ourselves. Currently, there are three blends that are available for selling, and the company are working on adding three new ones. The company is concentrated rather on the retailers, but there is also have an offer for specialized retail chains, restaurants and other wholesalers. The company need to develop a site to talk about the company (services, offers etc.) and about coffee in general. In addition, the company is going to sell prepared blends via the site.

To solve this real-life problem and make a full-functioning dynamic site prototype in Figma, we offered students to create three groups, according to the roles which are typically fulfilled by interface designers at the different stages of the prototype developing. Therefore, there were selected the groups of Analytics, Developers, and Testers.

The didactic benefit of such group work on Classcraft platform in terms of blended learning is seen in following. Each group has to realize perfectly well the aim and essence of work at each stage of the prototype creation, and to allocate the roles inside the group correspondently. Thus, the students (with the teacher's help) have to interact with each other within the group in order to discuss and understand its specific task, final goal of the whole group, and the importance of their results for the success of other two groups who realize their own mission in the iterative process of the dynamic prototype development.

For example, the group of Analytics was encouraged by the teacher to hold debates with the help of, for instance, Socratic method of discussion as a kind of cooperative argumentative discussion based on asking and responding questions to provoke stu-

dents' critical thinking and come with fruitful ideas. In particular, the set of issues for discussion by the Analytics for the understanding of their group mission included the following questions:

1. Who are our potential users?
2. What may be their age, education, needs, preferences etc.?
3. What tasks do the users want to solve via the site?
4. How are they going to solve their problems?
5. Which benefits from the users' standpoint can the site interface provide?
6. How to collect the said data from the users?
7. How can the collected information about users and their potential behavior on the site help the group of Developers? Is it essential also for Testers group? and others.

As a result of these argumentative debates, the group can obtain comprehensive understanding of their role in the whole iterative process of the prototype design, and can easily allocate the roles within the group with understanding by each member their own duties, responsibilities and scope of necessary interaction with members of other groups.

Similar debates were prepared and held in the groups of Developers and Testers. At some stages of work, it was initiated by the teacher interaction all the groups together in order to analyze the middle results of group work, such as Use Case diagram, Sequence diagram, mockups etc. built by the Developers group basing on the recommendations of the Analytics group. It helped to correlate the previous Analytics work, improve the Developers work immediately and avoid drawbacks and mistakes which may be revealed by the Testers group.

Analyzing the progress of the presented group work upon real-life tasks which also had a character of a role playing game, we would conclude the following. This form of work brought obvious interest and joy both to students and teacher, which caused a fruitful influence on the students' attitude to learning process and its results.

In particular, we could monitor appearing true incentives to learning, and arising motivation to classes preparation as well as to active participation in common work.

Emotional involvement into the group game according to their personal role and practical value of the tasks, made students keep educational content longer in their memory, speculate on it before and after classes, which provoked their inquisitiveness and enhanced their cognitive interest.

Therefore, it is possible to anticipate that such kind of blended learning technique enriched with interactive methods can have a positive impact on the students' motivation.

Digital storytelling as a common blended learning technique was also implemented in the process of interface design mastering within all the modules. We would like to demonstrate the example of creation of student-generated comic-based story in the progress of learning psychological basics of interface design which had a didactic purpose to investigate the influence of color pallet on the emotional stay of a user and implementation of its impact in the interface development.

At the preparation stage of the comics' creation the trainees were stimulated to discuss in group the issues which could help direct them during this creative task:

1. What is the goal of telling your story?
2. Who is the target audience of your digital story?
3. What feelings, emotions and ideas would you like to convey to the target audience?
4. What are the steps of your plot? How can you sequence the story with a beginning, middle part and final?
5. Which tools could be used to create your digital comic-based story? Which of them fit better for your idea and why? etc.

After this group solution findings, the students came to the core stage of the digital story making, according to their plot, and applying some of the graphic design tools on their choice.

Then, the groups of students demonstrated their comics and "told" their digital stories on the said topic during online practical classes.

Other trainees were engaged in the critical watching of their peers' digital stories. Therefore, at this stage student-generated digital stories served as cases that allowed involving all of the trainees into effective case studies, which added interactivity in the storytelling learning approach, raised the degree of students' participation in the tutorial process, which obviously affected their motivation.

In addition, the students were informed that their digital stories will be implemented as learning aids for further generations of trainees in the relevant interface design courses, which had a positive impact on the students' self-estimation, raised their responsibility, provoked their desire to contribute the best, and finally influenced on their learning motivation.

Episodes of one of student-generated comic-based digital stories where trainees expressed their ideas (in

Ukrainian) for associated meaning of different colors are given in figure 3(a)-(c)). In particular, in their digital story the students tried to render the associations of colors with our feelings and emotions: white – horror, black – grief, green – envy, pink – pleasure, purple – evil, light – happiness.



(a)



(b)



(c)

Figure 3: (a-c) Episodes of the student-generated digital stories on associated meaning of different colors (the explanations are given in the text above).

3.3 Preparation of the Survey on the Estimation of Students' Motivation

In order to estimate the level of the students' motivation to learning it is necessary to elaborate its criteria, develop their indicators, and determine the levels of their revealing.

As it was mentioned above, according to psychological background of motivation theory and its educational aspects, motivation to learn is defined as the personal efforts which encourage trainees to learning activities, ensure their continuity and concentrate a trainee on the activities with the aim at achievement of their desired goals. Among the most influential factors which affect student motivation are called attention, appealing to learner's past experience, positive attitude, and satisfaction.

Resting on this understanding of the learning motivation, and minding core rules for design of tutorial process and environment regarding motivation raising, we managed to elaborate several indicators and their levels. The core rules were presented in the theoretical framework chapter and can be formulated in brief as follows:

1. to apply methods for attraction and retaining learners' attention;
2. to set clear instructional goals and provide learners with educational content which refers to learner's needs and experience (academic and/or working one);
3. to shape student's confidence, creating learning environment which enables to promote learners' positive attitude to the tutoring process and suggest focusing towards success;
4. to create conditions to help students gain satisfactory feeling.

The survey was designed to evaluate whether the interactive methods introducing into the blended learning activities is in line with the aforementioned rules and detect what students' motivation levels are.

The survey consists of 20 items comprising 4 subsections corresponding to the amount of the rules. Each subsection included 5 items to get a feedback from the students on each motivation dimension. It measures learners' motivation level by applying a 5-point Likert-type scale (1 is strongly agree; 5 is strongly disagree).

Subsection 1 (*attention*) included the following questions.

Q1 There was some thought-provoking content of the course that got my attention.

Q2 I attended online classes with desire because there were used variety of gripping activities.

Q3 Communication with other students during debates and discussion helped hold my attention.

Q4 I was eager to attend classes because there usually were some things that were surprising or unexpected.

Q5 This course has things that stimulated my curiosity and I speculated about the learning material after classes.

Subsection 2 (*appealing to learner's needs and experience*) included the following set of items.

Q6 It is clear to me how the content of this course is associated with the things I already know.

Q7 I was involved into the work upon the tasks that demonstrated me how this course material could be useful to me and some other people.

Q8 Completing this course successfully was essential to me.

Q9 The content and style of the course material mastering is relevant to my needs and interests.

Q10 There are explanations, examples, cases etc. of how to use the competence from the course in daily professional activity.

Subsection 3 (*positive attitude*) included the following items.

Q11 The tutoring process within the course was entertaining.

Q12 Team interaction during material mastering suggested me confidence in my abilities to succeed in the course.

Q13 When I had learning difficulties, I felt confident that I could overcome them with my peers' help.

Q14 During online classes I felt myself happy as if I learnt material with my peers in real classroom.

Q15 As I worked on this course, I was confident that I could learn the content.

Subsection 4 (*satisfaction*) included the following items.

Q16 Completing the tasks and presenting my results in front of the group during online classes gave me a satisfying feeling of accomplishment.

Q17 I enjoyed this course so much that I would like to know more about this topic.

Q18 I really enjoyed when I contributed my expertise into the common result of my team going through the course material.

Q19 The sounding of feedback during and after the exercises in this course helped me feel rewarded for my effort.

Q20 It was a pleasure to work on the course in such a friendly and cooperative atmosphere.

To obtain preliminary results and test the designed survey reliability, it was conducted in one of the groups of pre-service IT specialists who completed the course "User interface design basics" in terms of

blended learning activities enhanced with interactive methods and built according to our modules depicted above. In total, 27 students took part in the survey.

The scale reliability test was conducted to estimate the result. The reliability of all the four scales (for each motivation dimension) on standardized Cronbach Alpha was 0.75 ($n = 27$ on 20 items), which proved an acceptable reliability of the obtained result (Glen, 2023).

3.4 Discussion of the Preliminary Results

The average score of the students' motivation level as for all motivation dimensions, detected during the survey is presented in table 1.

Table 1: The average score of the students' motivation level ($n = 27$)

| Motivation dimensions (5 items each) | Average score |
|---|---------------|
| Attention | 3.42 |
| Appealing to learner's needs and experience | 3.61 |
| Positive attitude | 3.65 |
| Satisfaction | 3.63 |
| Overall (20 items) | 3.57 |

According to the score intervals, we distinguished four levels of motivation:

- High level (4.0-5.0),
- Intermedium level (3.5-3.99),
- Pre-intermedium level (3.0-3.49),
- Low level (lower than 3.0).

The results of the survey, according to the levels of students' motivation are shown in the table 2.

Table 2: Range of students' motivation level as a result of the survey.

| Motivation level | Scores | Total $N = 27$ | Percent |
|------------------|----------|----------------|---------|
| High | 4.0–5.0 | 13 | 48.15% |
| Intermedium | 3.5–3.99 | 6 | 22.22% |
| Pre-intermedium | 3.0–3.49 | 4 | 14.81% |
| Low | <3.00 | 4 | 14.81% |

As far as we can judge from the table 2, 13 (48.15%) out of the 27 respondents demonstrated high motivation level, 6 students (22.22%) had intermedium motivation level, 4 respondents (14.81%) revealed pre-intermedium level, and 4 respondents (14.81%) demonstrated low motivation levels. Thus, it was found out that the survey participants were mostly satisfied with the course material and blended

learning techniques enhanced with interactive methods, with almost half of the respondents who had high level of motivation, and over 22% of them who revealed intermedium level of motivation to learning.

In addition, characterizing roughly the students' answers of the survey questions (Q1–Q20), we would like to emphasize the following.

About 70% of the trainees admitted that they attended online classes with desire because there were used variety of gripping activities; communication with other students during debates and discussion helped hold their attention; the course stimulated their curiosity and they speculated about the learning material after classes.

Over the half of the students said that during the course doing, they were involved into the work upon the tasks that demonstrated them how this course material could be useful to them in their potential professional life.

About 63% of the course participants revealed positive attitude to learning admitting that the tutoring process within the course was entertaining; team interaction during material mastering suggested them confidence in their abilities to succeed in the course; during online classes they felt myself happy as if they worked with their peers in real classroom.

Finally, about 72% said that they were pleased to work on the course in such a friendly and cooperative atmosphere.

The obtained survey results are complemented with our own observations. It was prepared by us special program of monitoring the students' attendance and behavior at online classes during different stages of the course. Our monitoring, according to this program, testified raising the percentage of students' attendance by 20% in comparing between beginning and end of the course.

In addition, our observations as for the students' cognitive behavior allowed to conclude that applied methods were productive in terms of encouraging motivation. They helped students feel the classroom atmosphere during online classes, promoted their cognitive eagerness to work with remote digital resources, contributed into effective learning communication, which helped overcome the feeling disconnection between the students inherent to blended learning in its flex model.

It was also monitored the growing of students' desire to take part in group activities, to reveal their knowledge and contribute best into the common group result. It was really pleasant to notice also some students' increasing tendency to find out additional learning materials and eagerness to do the tasks of higher complexity. It was also detected the raising

of overall academic achievements of the group.

Thus, the obtained results of the conducted survey and our monitoring program may be taken as a basis for holding the full empirical research for the verification of the impact that made the offered blended learning activities enriched with interactive methods on the level of students' motivation and the results of pre-service specialists' training. It is planned to widen respondents' range to generalize the survey results and to expand it by clarifying and specifying the changes made in the research, which makes a prospect of our work.

4 CONCLUSIONS

The problems of raising students' motivation in terms of blended learning implementation at national universities are discussed in the paper in the context of interface design mastering by the students of various specialties.

Based on the recent studies review and educational practice analysis, it is revealed the urgency of our research connected with the problems of dropping students' motivation to study and to accomplish university education in general (students very often are eager to. It is analyzed that the situation is getting even worse in terms of blended learning with the focus to remote tutorial process. Retaining students' motivation to attend online classes, to earn knowledge and skills and work them out via different typical learning activities becomes really challenging task for educational staff.

It is also revealed that the using of the specially developed learning activities and methods is underestimated by the researchers and practitioners of blended learning implementation. It underlined the urgency of enhancing typical blended learning techniques with interactive methods in order to overcome the core challenges of the blended learning implementation, and to raise students' learning motivation in terms of current online studying.

Theoretical framework of the research is made by the analysis of the (1) fundamentals of motivation theory; (2) main characteristics of blended learning and its typical learning techniques used in the practice of blended learning; (3) basic approaches to the mastering of the fundamentals of user interface design in the training of different specialists.

In the progress of work, there were analyzed the core features and challenges of blended learning, and covered the ways of enrichment of the blended learning techniques (flipped learning, gamification, digital storytelling, cooperative learning etc.) with interac-

tive methods and forms of work.

The experience of interactive methods practical realization in the process of the user interface design mastering by university students is presented. It was demonstrated how the considered leaning techniques which are typically used at blended learning in its flex model can be enhanced and enriched via using different interactive methods. Exact examples of their applications in real blended learning process are given.

It is also covered the preparation stage of the survey on the estimation of the students' motivation. The survey was designed to evaluate whether the interactive methods introducing into the blended learning activities is in line with the aforementioned rules and detect what students' motivation levels are.

The survey consists of 20 items comprising 4 subsections corresponding to the amount of the revealed motivation dimensions (attention, appealing to learner's past experience, positive attitude, and satisfaction).

To obtain preliminary results and test the designed survey reliability, it was conducted in one of the groups of pre-service IT specialists who completed the course "User interface design basics" in terms of blended learning activities enhanced with interactive methods and built according to our modules depicted above. The acceptable reliability of the scales was proved.

According to the score intervals, there were distinguished four levels of motivation. The results of the survey, according to the levels of students' motivation are presented and discussed. There were also given and discussed the results of the authors' observations according to the monitoring program.

It was concluded that the obtained results of the conducted survey and our monitoring program may be used potentially as a basis for holding the comprehensive empirical research for the verification of the impact which made the offered blended learning activities enriched with interactive methods on the level of students' motivation and the results of pre-service specialists' training. It is planned to widen respondents' range to generalize the survey results and to expand it by specifying the changes caused by the introduced methods, which makes a prospect of our work.

The prospects of the research also can be focused on finding out the most effective combinations of blended learning techniques and interactive methods in the process of interface design mastering by the students of different fields.

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