

PROBLEM BASED LEARNING DURING CONTACT AND ONLINE LEARNING

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Annotation

The aim of this article is to present the analysis of assessment objects – motivation, group work, assessment/self-assessment, skills formation, performed during problem-based learning in different student learning conditions. The essence of problem-based learning is to learn to solve problems by working in groups or teams, to search for information independently, to develop problem – solving strategies, to evaluate the work which was done. During a pandemic, online learning poses challenges for students to work in groups and assign tasks, as well it is more difficult to communicate and collaborate, which can make it more difficult to develop the necessary skills.

Key words: problem-based learning, PBL, contact learning, online learning.

Introduction

Problem-based learning is relevant to today's students and is widely applied around the world. PBL aims to foster a wide range of skills such as communication and collaboration skills, decision making, problem solving, critical thinking, and self-directed learning (Wilder, 2014). Problem-based learning (PBL) is a teaching style that pushes students to become the drivers of their learning education.

Problem-based learning strategy is a didactic innovation that has been widespread in America, Canada, Australia, Benelux, Scandinavia since the 1980s. In PBL, the use of real, ill-structured problems provides a context for the development of students' knowledge and skills (Reich et al., 2007). An important aspect in preparing a comprehensive professional is the combination of special, social, and personal abilities. The development of personal skills does not necessarily require separate subjects, and in most cases these skills can be developed alongside special subjects using a variety of methods. For example, when studying a specialty subject, students are given the task of solving a problematic situation – this develops personal skills to organize and plan their activities, solve problems, respond flexibly to change; or to carry out a joint project with course colleagues – thus developing social skills – communication and cooperation. In this way, future veterinary specialists acquire more independence, information literacy, teamwork skills, are able to better analyze their own and colleagues' work process and results (Balkevičius, Jarulė, 2017).

Digital education is changing the way in which health professions education, including PBL, is conducted. Although there is evidence on different applications of digital technology in PBL, it is still unclear how effective it is to integrate digital technology within PBL as compared to traditional PBL (Jin & Bridges, 2014).

According to B. Aleksandravičiūtė and K. Liekis (2020), the culture of individual teaching and learning prevails in general education and higher education institutions in Lithuania. However, it is team tasks that help to form competencies that are highly valued in today's job market, because teams are essential for modern organization, so it is not for nothing that we are constantly looking for answers how to make teams work as effectively as possible, because the basic premise of teamwork is that the whole is better than the sum of its parts, which manifests itself in coordinating activities, cooperating (working together), and acting honestly.

In Vilnius College the veterinary study program, the problem-based learning methodology has been applied since 2016. Students work in groups to analyze specific clinical situations. It is especially important for future veterinarians to work in a team, because the results of teamwork are much better than working individually. Until the spring of 2020, problem-based learning took the place in college, through contact. From 2020 March we had to move to online learning, as things changed quickly and drastically, it was interesting to compare how a problem-based learning strategy works online.

Relevance of the research. The Covid-19 pandemic has posed significant challenges to the learning process, as most institutions conduct their studies remotely. Problem-based learning has been used in biomedical studies at the College for some time, so in such an extraordinary situation, it was interesting to compare how the problem-based learning strategy works in contact and online learning.

Research object: the strategy of problem-based learning during contact and online courses.

Aim of the research: to compare the effectiveness of problem-based learning during contact and online learning.

Objectives of the research:

1. To analyze students' motivation in solving problematic situations during contact and online learning.

2. To analyze the advantages and disadvantages of group work during contact and online learning.

3. To study students' attitudes towards assessment and self-assessment.

4. To find out how analytical, communication, work planning, group work, problem solving skills and abilities are formed during contact and online learning.

Research methods. Survey data analysis.

Literature review

Problem-based learning (PBL) has been used as an educational approach in health professions education in many medical and nursing school curricula worldwide for over 50 years (Lim, 2012). Learning in PBL is student centered and occurs in small collaborative groups while teachers take on the role of tutors. Although its implementation varies across different settings, PBL, in general, is an iterative process consisting of three parts: a problem-presentation and analysis phase, a self-directed learning phase, and a synthesis and reporting phase (Yew & Goh, 2016). The team-based teaching / learning strategy is widely applied in higher education various fields of studies and in various programs: most widely in biomedicine and social sciences (Aleksandravičiūtė, Liekis, 2020). There are not many examples in the theory and practice of veterinary didactics on how to correctly create and analyze the problems of a veterinary nurse according to the problem-based learning strategy (Balkevičius, Jarulė, 2016). In the process of problem-based learning, students gain new knowledge through self-directed learning, and lecturers act as facilitators who oversee the group learning process. The result of problem-based learning is the development of certain problem-based learning skills. A problem situation is a short story that encodes a specific problem, a learning object that learners need to reveal, describe, analyze, and solve in a self-directed learning process with the help of a facilitator (Balkevičius, Jarulė, 2017). According to Savin-Baden (2004), problem situations must reflect the context and content of the subject.

In higher education, teaching according to the problem-based teaching methodology is replaced by a process of facilitation, which helps to create constructivist and socio-constructivist learning environments that better realize the principles of modern learning such as constructivism, self-government, cooperation and contextuality. The facilitation process provides an opportunity for the learner to take personal responsibility for their own learning process while working and learning, solving problems in the professional field more independently (Balkevičius, Jarulė, 2016).

A well-chosen evidence-based practice (EBP) teaching / learning strategy in the nursing study program provides more opportunities to link the theoretical and practical training of future nurses to ensure a quality clinical teaching experience. By learning through the five-step teaching model of the EBP, students think, ask questions, and take action, realizing that they have the power to change the world around them. The student is interested to receive information, he / she is looking for ways to obtain, store, process and assimilate the information. The teacher remains only the role of an observer, a facilitator, and the student also independently forms his / her own approach to the organization of nursing (Šakalytė, Indrašienė, 2021).

Many traditional learning methods can be transferred to the virtual space. Methods such as lecture, discussion, debate, case study, repetition and consolidation, educational games, experimentation, search for new resources, exploration, practice exercises, tasks that require creative thinking, and so on can be applied remotely (Brazdeikis et al., 2020).

Digital technology primarily supports PBL principles and processes by enabling contextual and collaborative learning (Verstegen et al., 2016). According to Elzainy et al. (2020), most of the students were unsatisfied with how some staff members practiced e-learning. However, more research has been done, such as Tudor et al. (2019) states, that Digital Problem Based Learning (DPBL) is as effective as traditional PBL and more effective than traditional learning in improving knowledge. DPBL may be more effective than traditional learning or traditional PBL in improving skills. Further studies should evaluate the use of digital technology for the delivery of other PBL components as well as PBL overall.

Methodology

The surveys were conducted in 2019–2021, after completing the disciplines during which problem-based learning was applied. The questionnaire was submitted to the 3rd year students of the Vilnius College Veterinary Study Program. The questionnaire was first submitted in 2019, during contact learning, in 2021 the same questionnaire was provided during online learning.

In both cases, four assessment objects were assessed – motivation, group work, assessment/self-assessment and development of skills and abilities. Five attributes/control statements of the assessment objects were selected for each assessment object. The assessment objects were compared with each other, their similarities and differences during contact and online learning were analyzed.

In the first study (2019) the questionnaire was provided to 52 students, in the second study (2021) the number of respondents was slightly lower – 49.

How the lectures were conducted according to the problem-based learning methodology? During the study of the clinical subject, a small group of students (4-5 people) received a problematic situation. A problem situation is a short story that encodes a problem(s) that needs to be clarified and solved by students working independently in work groups, according to a problem-based learning methodology. The problem situation must be complex – involving various actors and factors. The problem situation encodes a problem in the range of competencies of a veterinarian - i.e. the problem can be identified as a consequence of the actions or omissions of the veterinarian (i.e. the activities for which he is responsible) or a particular disease/pathology that needs to be disclosed and explained. Problem situations do not arise out of nowhere, they are created according to the content of the subject taught and are usually taken from real past or imaginary clinical cases or situations. Students who receive a problem situation must first draw a picture / draw a scheme / photoshoot or find a picture online that best describes the specific situation. After that, students have to raise questions according to which they tried to unravel in that problematic situation. After students present the problematic situation and what issues they raised. Students filled information in a problem diagram, in which they identified the type of problem, distinguished the main and secondary problems, purpose of solving the problem. They also provided success criteria for solving the problem and commented on the scheme of the problem. They also completed an information source analysis scheme, citing literature sources where they found information on the issues raised. After that, they developed a problem-solving strategy, which described the causes of the problem under analysis, described ways to prevent such problems, and the methodology of correct action of the actors. In the problem solving monitoring work template, the problem solving strategies were combined with the problem solving goal and the problem solving success criteria. The presentation of the problem situation takes place in PowerPoint in collaboration with all the members of the group. Everyone presents their contribution to a problematic situation. The presentation is followed by a brief discussion of the problematic situation. The analyzed problem situations help to develop not only subject but also general competencies (learning to learn, communication, cognition and creativity).

Problem-based tasks are related to real situations in the clinic or elsewhere that need to be investigated, thus developing cognitive skills: to formulate a problem clearly, to create a model for its solution, to perform the necessary procedures and to relate the result to the initial situation. While solving tasks, students analyze a variety of information, look for relationships and patterns, formulate conclusions, and try to substantiate their decisions or conjectures in a variety of ways.

In Lithuania, the application of problem-based learning methods to both veterinary nurses and veterinary surgeons is an area of little research. Research papers focusing on PBL teaching veterinary professionals has not been detected.

After completing the problem-based learning course, students are given a questionnaire to fill, the results of which are presented in this article.

The results of the study were summarized, analyzed and conclusions were drawn.

Results and Discussion

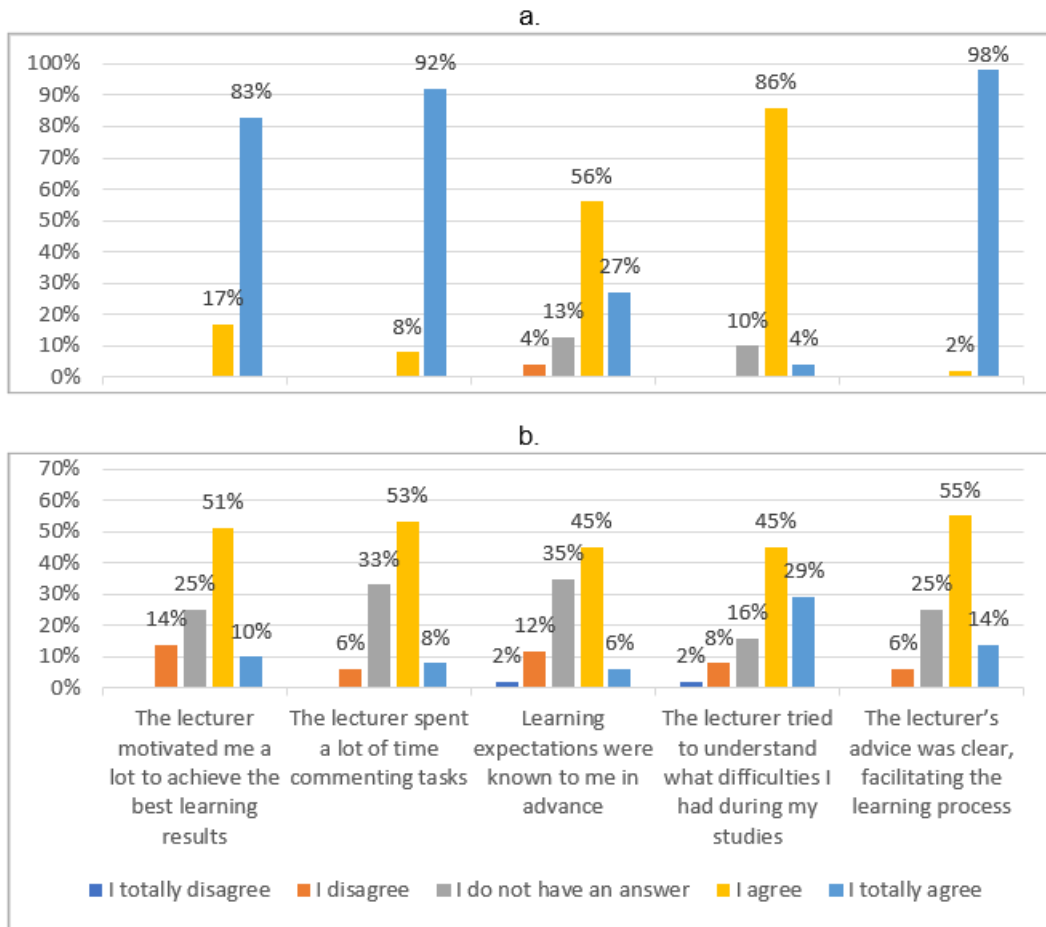


Fig. 1. a. Assessment of students' motivation during contact learning; b. Assessment of students' motivation during online learning

During online work, students' motivation (Fig. 1., b.) was significantly reduced, by just over 60 percent of students stated that the teacher motivated them to achieve the best learning results, spent a lot of time commenting on the assignments, the lecturer's advice was clear, and the lecturer tried to understand the difficulties encountered during learning. Learning expectations were clear for 51 percent of students, almost 35 percent had no answer to this, and for 14 percent of students learning expectations were completely unclear.

According to Šakalytė D. and Indrašienė V. (2021), the teaching of evidence-based practice based on simulation and clinical scenarios increases students' interest in EBP. Frame et al. (2016) state that applying an evidence-based practice strategy provides greater satisfaction for students.

It can be said that during online teaching, more video material with clinical scenarios and simulations using mock-ups, mannequins, or virtual clinic / laboratory devices should be introduced to stimulate greater student interest and motivation.

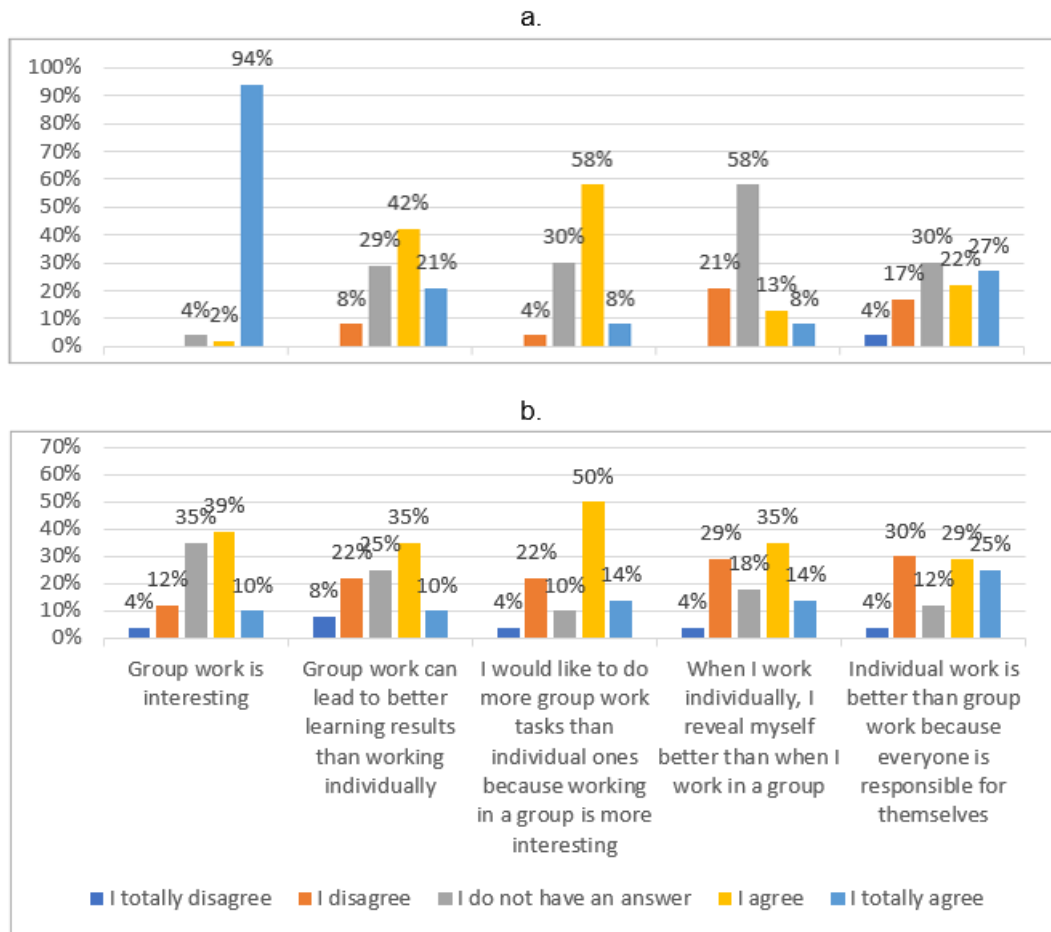


Fig. 2. a. Assessment of group work during contact learning; b. Assessment of group work during online learning

94 percent of students who studied through contact (Fig. 2., a.) said that group work is interesting. 63 percent of students said that better learning results could be achieved through group work, 29 percent did not know the answer and 8 percent argued the opposite. Two-thirds of students (66%) said that they would like to do group tasks more often, 30 percent had no opinion and 4 percent argued the opposite. 21 percent of students believe that they reveal themselves better by working individually, 58 percent have no answer to the question and 21 percent argues the opposite. 71 percent said that individual work is better than group work, because during it everyone is responsible for themselves, 12 percent do not know the answer 17 percent argued the opposite.

During online learning (Fig. 2., b.), only 49 percent said that group work is interesting, 35 percent had no opinion and 14 percent argued the opposite. That group work can achieve better learning results than working individually said 45 percent of students, 25 percent had no opinion and 30 percent argued the opposite. 64 percent of students said they would like to do more group tasks, 10 percent had no opinion and 26 percent argued the opposite. 49 percent of students said that working individually is better than working in a group, 18 percent did not have an opinion, 33 percent argued the opposite. 54 percent of students think that individual work is better than group work, 12 percent did not have an opinion, 34 percent argued the opposite.

Group work – division of students' work, was relevant only during contact work. During the online learning, the task was usually performed by one student, in rare cases others provided comments.

Šakalytė D. and Indrašienė V. (2021) after the analysis of the articles, state that the combination of lectures, group discussions, team and individual learning/teaching is effective. According to Nokes-Malach et al. (2015) the key question is not whether collaboration benefits learning, but how and when collaboration improves outcomes.

Kyriakoulis et al. (2016) state that teaching through evidence-based practice and in order to increase student engagement and promote their learning experiences it is recommended to include traditional and interactive teaching methods: traditional lectures, computer sessions, group discussions, classes or a combination of these methods.

During online learning, students are more likely to work individually rather than in groups. To make group work more interesting way during online learning, students should be more motivated and directed in the direction that tasks should be distributed and that they should communicate and collaborate more. It can be assumed that some students feel isolated during a pandemic and that collaboration with colleagues becomes difficult for them. As a result, one or two students often take the lead in the task, while others play only the role of passive observers.

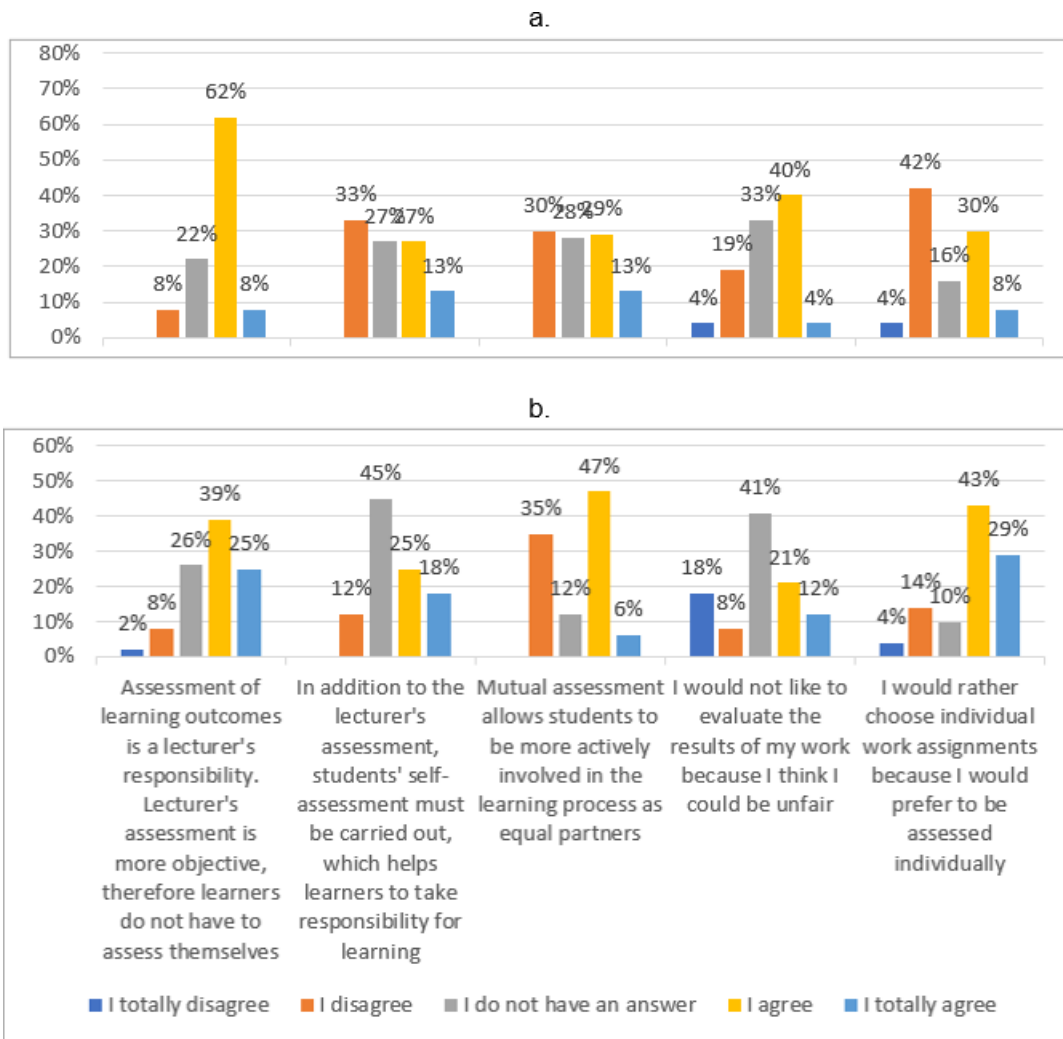


Fig. 3. a. Assessment/self-assessment during contact learning; b. Assessment/self-assessment during online learning

Similar number of students studying both contact and online (70 percent and 64 percent) considered that the assessment of learning results is the responsibility of the lecturer (Fig. 3.). 40 percent of contact students and 43 percent online learning students think that students' self-assessment must also be carried out in addition to the lecturer's assessment.

42 percent of contact learning students and 53 percent online learning students believe that mutual assessment allows students to be more actively involved in the learning process as equal partners. The number of students who disagreed with this opinion was very similar – 30 percent and 35 percent respectively. 44 percent of students who studied in contact and 33 percent of online learning students would not like to evaluate the results of their work, respectively 23 percent and 26 percent, of the rest had no opinion on the matter.

38 percent of contact students and even 72 percent of online learning students would prefer to be assessed individually (would choose individual tasks). 46 percent of contact students and 28 percent of studying at an online would not want to be individually assessed and 28 percent online-learning students, others had no opinion on the matter. This suggests that during online learning, students are more likely to do tasks individually, it is difficult for them to form and maintain a team. In addition, in the comments section of the questionnaires, several students noted that during online learning, the task is usually performed by one student, others seldom provide comments, and usually only agree with the colleague who performed the task without interfering in the task.

Aleksandravičiūtė B. and Liekis K. (2020) believe that every student and teacher probably had some negative teamwork experience. So it's natural if students can take a negative view of teamwork. Therefore, it is very important to properly explain how the team-based learning strategy works. And it is crucial to clarify all levels of responsibility / accountability. It is mentioned that there are several of them. First of all, it is an individual test during which the student's preparation is checked. This is an important part, but much more important and motivating part is the team test and the team task. However, in a team-based teaching / learning strategy, there is another point – the student's score for each other.

Most of the students think that the teacher should evaluate. Although about half of the students believe that mutual assessment allows students to be more actively involved in the learning process as equal partners, most would not want to self-assess. This trend is not very different during both contact and online learning. However, even 72 percent of online learning students would prefer to be assessed individually (would choose individual tasks) while only 38 percent would do so during contact work. This shows that online learning leads to individual learning, making it harder for students to focus and work in teams.

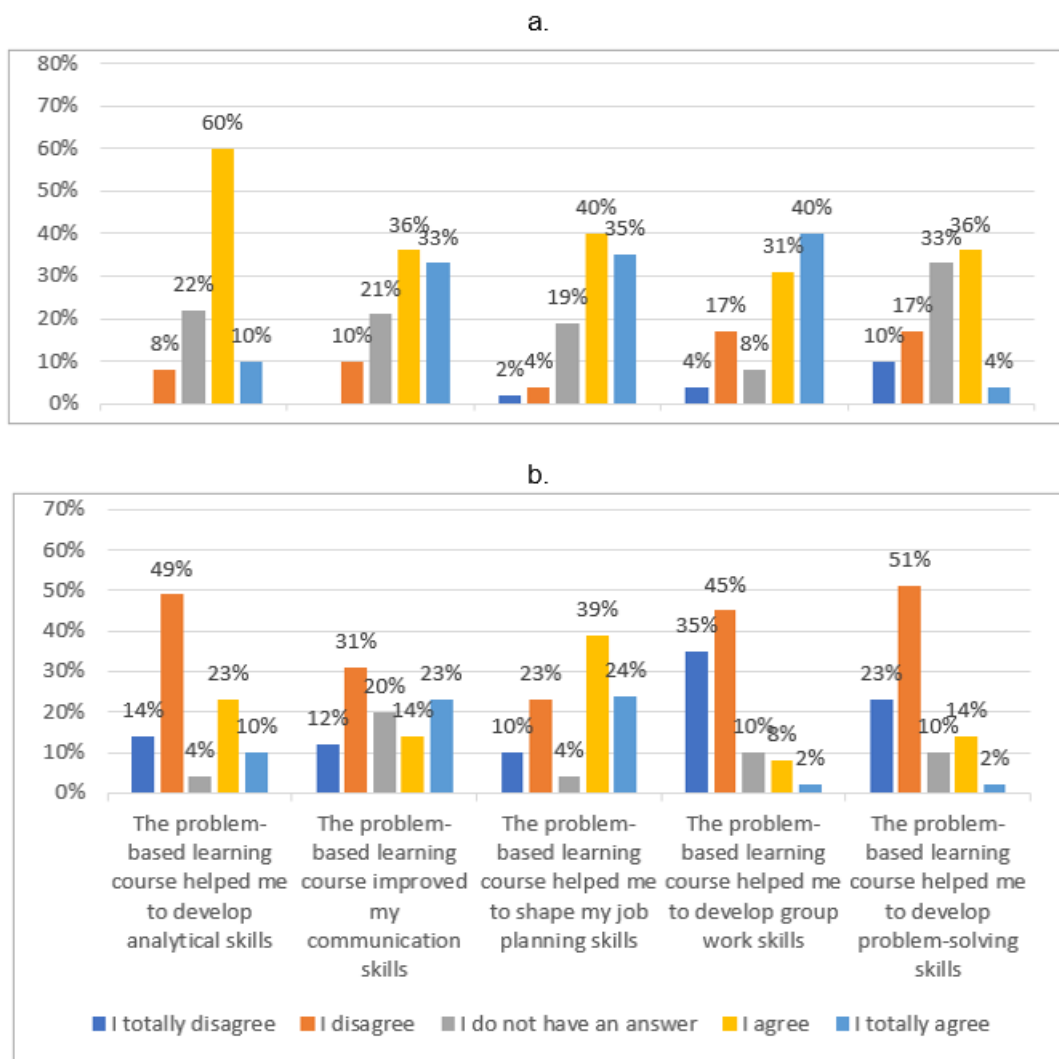


Fig. 4. a. Assessment of skills and abilities development during contact learning; b. Assessment of skills and abilities formation during online learning

The problem-based training course helped to form the analytical skills for 70 percent contact and 33 percent online learning students (Fig. 4.). 8 percent of contact and even 63 percent of online learning students think that analytical skills were not formed.

Communication skills were improved by 69 percent of contact and 37 percent of online-learning students, 10 percent and 42 percent students respectively think that they did not improve these skill. Students noted that it was more difficult for them to communicate remotely because "thoughts kept diverting somewhere else", "more important jobs would appear," or "communication was simply hindered by other family members".

75 percent of contact and 63 percent of online-learning students think that improved job planning skills, that did not improve these skills, think 6 percent and 33 percent of students respectively. Students studying in a contact way noted that they tried to plan the work so as not to be entrusted to the team members, therefore they always tried to complete the tasks assigned to them on time. Several online-learning students envisioned task work planning as a combination of study with their own work rather than with the team with which they had to perform distributed tasks.

Teamwork skills improved by 71 percent of contact and 10 percent of online learning students, 21 percent of contact and 80 percent of online-learning students did not improve their skills. Problem solving skills were formed by 40 percent of contact and 16 percent of online learning students, 24 percent of contact and 74 percent of online learning students have not developed these skills.

According to Lehane et al. (2017), applying an interactive teaching/learning strategy, students are encouraged to creatively develop both general and special nursing professional skills. Aronoff et al. (2017) state that the inclusion of evidence-based practices in e. learning modules into the study process, students acquire and consistently develop knowledge of EBP and engage in interprofessional evidence-based activities.

Online working students do not always go deep enough into the tasks, they often leave decisions responsibility for teammates, so the survey data show that group work skills improved for 70 percent of contact and only 10 percent of online learning students. Problem solving skills were formed for 40 percent of contact and 16 percent of online learning students. The problem-based learning course helped to develop analytical skills and improved communication skills by about 70 percent of contact and more than 30 percent of online learning students. And only job planning skills were improved by a similar number of learners in both ways (75 percent contact and 63 percent online learning students). This shows that it is not enough to present tasks in the same way as in contact work, therefore, the tasks and the ways of presenting them need to be improved in order to motivate and interest the student as much as possible.

Conclusions

1. During contact teaching, solving problematic situations, students' motivation was high, almost 100 percent. During online learning, students' motivation is significantly reduced – only a little more than 60 percent of students said that the teacher motivates them to achieve the best results, spends a lot of time commenting on tasks, gives clear advice.

2. 94 percent and 63 percent said that group work is interesting and that better learning results can be achieved, the same opinion had 49 percent and 45 percent of online learning students. Group assignments are acceptable for approximately 65 percent of students, regardless of the way their studies are conducted, but only 21 percent of contact learning students think that they are better revealed during individual work and almost half (49 percent) of online students think the same.

3. The vast majority of students studying in both ways consider assessment to be the responsibility of the lecturer, but almost half agree that mutual assessment allows students to participate more actively in the teaching process as equal partners and that in addition to teacher assessment, students must self-assess. Only about a quarter of students would like to evaluate the results of their work, 33 percent of contact and 41 percent of online learning students did not have an opinion on this issue. 38 percent of contact and 72 percent of online learning students would prefer to be assessed individually.

4. The problem-based learning course helped to develop analytical skills and improved communication skills by about 70 percent of contact and more than 30 percent of online learning students. Both contact and online learning students improved their job planning skills (75 percent and 63 percent, respectively). Group work skills improved for 70 percent of contact and only 10 percent of online learning students. Problem solving skills were formed for 40 percent of contact and 16 percent of online learning students.

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