

IV. Animators in the local environment – examples of integration activities.
How to educate people to stop violence against *other*?

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What if... – planning and implementing lesson scenarios during online school practise

Introduction

Teaching and learning are processes that affect one's future. Teaching is a beautiful, interesting, demanding, and very difficult task, especially for young teachers. The teacher plays an extremely important role in influencing the quality of the education process (Caires et al., 2012; Aglazor, 2017).

In the literature, science teaching can be defined in terms of the knowledge that teachers use in their teaching (Guskey, 1989). Each teacher must have subject-matter knowledge (CK), general pedagogical knowledge (PK), and pedagogical content knowledge (PCK) (Schulman, 1986; Ball, 2000; Bucat, 2005; Abell, 2008). Formal (substantive, methodical, and organizational) preparation and teaching practice are required from each teacher, including the pre-service teachers training students.

During substantive preparation, all content and issues to be discussed during a lesson should be determined together with their purposes and order, keeping in mind the principles of teaching. Methodical preparation requires finding an answer to the question of how the particular lesson should be carried out – which teaching methods and didactic (teaching) aids should be applied. The actions of the teacher and student must be determined together with forms and methods of control and homework. On the other hand, organizational preparation is related to the preparation of the workplace and the necessary didactic (teaching) aids (Krzeczowska, 2020).

Teaching is a much more difficult task. It requires different types of method, techniques, and strategies depending on the school subject, the nature of the task, learning objectives, pupils' abilities, and students' entering behaviours. Teachers know that each lesson must be properly organized and well planned. Planning helps make your lessons clear, brief, and well-timed, so that students can be active and interested. Each lesson should be carried out according to a certain task plan called the lesson plan. When planning and implementing the teaching process, it is worthwhile that the teacher is aware of the basic teaching principles.

According to researchers, teaching strategies are important for an effective educational process (Sancar, Atal and Deryakulu, 2021). The teacher should be characterized by a flexible work style that changes and adjusts the methods of work and the scope of the material to the needs and interests of the student. The teacher's role is to facilitate the acquisition of knowledge by students, and when selecting teaching methods and didactic resources, they must remember the diversity of learning styles, way of thinking, and student personalities (Junior, 2020).

The pre-service teachers training – JU case study

The Faculty of Chemistry of Jagiellonian University in Kraków offers the opportunity to obtain the qualification to teach chemistry in school by starting students' participation in pre-service training. Figure 1 shows all the supplementary and compulsory courses that should be conducted during the first and second cycle study programme.

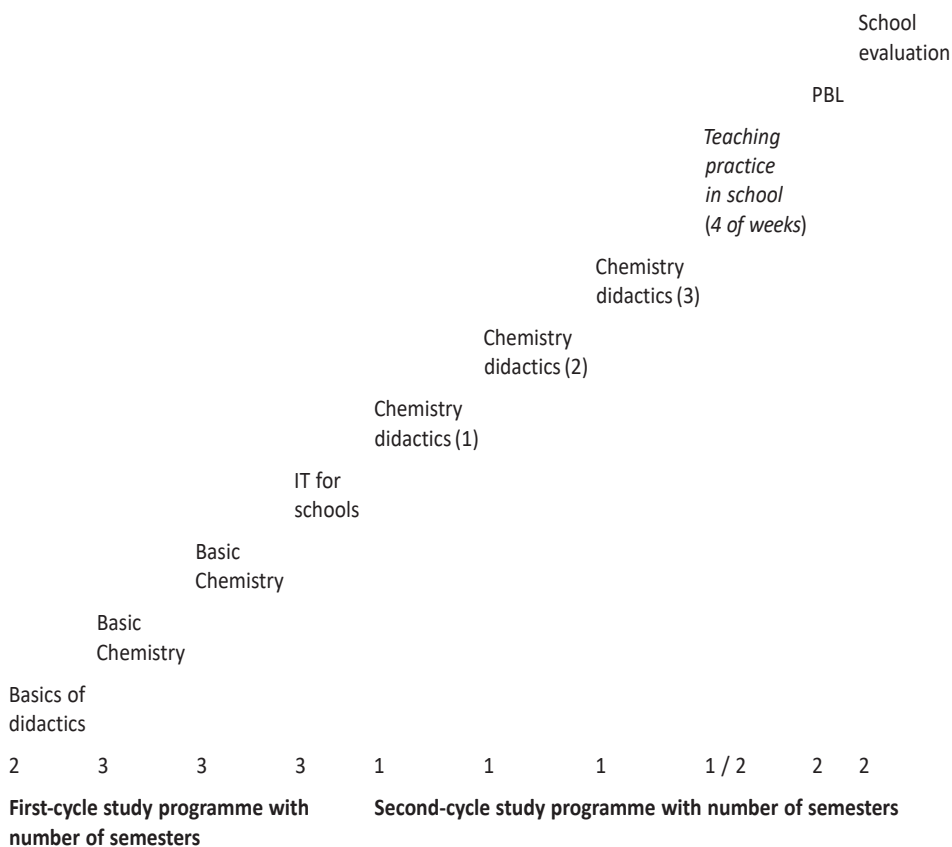


Figure 1. Details of the pre-service chemistry teachers' training programme

The practice of teaching in school is a crucial part of the pre-service teacher training. As Chong and Low (2009) reported, teaching practice is effective in students' decision to become a teacher or not; After teaching practice, students (future teachers) decided whether or not to pursue the teaching profession. Kirbulut and Bektas (2011) suggested that an answer be found to the following questions. How do you know if your lesson was good? – How do you make plans to improve your teaching? Reflection is needed.

The practice of teaching in school must be preceded by good theoretical preparation. Students learn about teaching methods, strategies, and rules, as well as didactic tools. Planning a lesson, formulating tasks, preparing didactic tools, and writing the outline of the lesson are the next topics of discussion in the students meeting.

An exemplary lesson plan form (outline/scenario) with some comments is presented in Appendix No. 1. This form (outline) is based on some didactic sources from the literature (Burewicz and Gulińska, 2002; Kruszewski, 2004; Bereźnicki, 2007).

Purpose of the study

One of many important questions in the teaching process which university students asked themselves is how to design a lesson to use it for effective education and relieve students of boredom?

The objectives of this article were to:

- examine the didactic situations used in the lesson, allowing for the proper involvement of the school student.
- identify different forms of summarizing lessons and homework;
- analyze the implications of the teaching and learning strategies aiming to promote questioning during lessons;
- identify a different theme of the lessons taking into account the possibility of making students interested in the lesson.

The main research questions of this project were:

- What strategies and teaching practices were used to promote school student questioning and engagement in order to ensure the proper teaching and learning process?
- How was the fact of distance learning influenced the methods of lesson recapitulation and homework forms?

Research methodology

1. Methods

The research method is a simple quantitative analysis of the content of the documents that allows obtaining information about quality of activities carried out by school students during the lesson (e.g Krippendorff, 1980; and Weber, 1990; Erlingsson and Brysiewicz, 2017).

2. Participants

The research was conducted on a randomly selected sample of all pre-service teachers training participants.

The participants in this study are 15 university students who enroll in various teacher education courses. During March 2021 to June 2021 students were escorted by university supervisor, visited the school virtually, met the school supervisor for the first time, and conducted virtually their own lessons.

It should be strongly emphasized that the students were not prepared to conduct online lessons in advance.

3. Context

The 15 students go to upper secondary school to virtually practice chemistry teaching under the supervision of a school supervisor and a university supervisor. Each student conducts virtually two lessons: the first at the basic level and the second at the level with extended chemistry program. The online lessons were held in a fully synchronous format. Among 30 lessons, 4 lessons represent revision lessons. The general idea for this is presented in Figure 2.

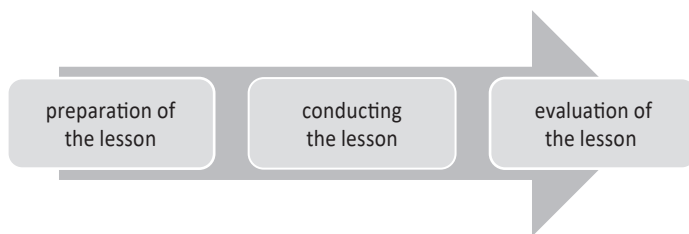


Figure 2. Three main parts of the chemistry teaching practice

During the 'preparation of lesson' part, the student prepares a detailed lesson plan using the format of the lesson plan that appeared above. This plan is sent to a school supervisor. While the student conducts the lesson, the rest of the group fills in the observation sheet. During observation of the lesson, a school supervisor and a university supervisor also fill out a special observation sheet. Each lesson is followed by a discussion phase.

4. Data collection

During March 2021 to June 2021, 15 students conducted virtually two lessons, for which 30 detailed lesson plans were implemented.

5. Data analysis

Research materials consist of 30 lesson scenarios.

To recognize difficulties in planning and conducting a chemistry lesson at school and to recognize areas requiring support and further development, students' outlines of

chemistry lessons with a detailed lesson plan (scenario) were analyzed. Each scenario was coded before the analysis process. The scenario analysis was performed by a person who did not participate in the lessons of the students. Five subject areas (defined categories of analysis) have been selected for analysis, which are presented in Figure 3.

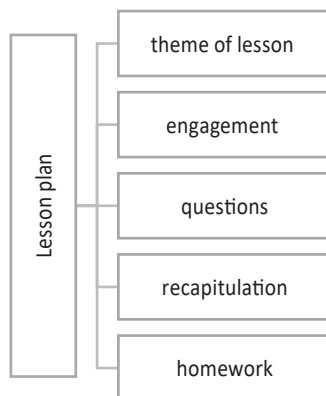


Figure 3. Chosen categories from the lesson plan

Results and discussions

1. The lesson theme (the lesson title)

The title of the lesson expresses the main general purpose of the lesson in relation to the content of the learning and teaching process. The title is the main and overarching theme of the lesson. What is the purpose of a theme? A good theme captures the interest of the student and is related to the main topic. Furthermore, the correct formulation of the theme also determines the important idea of the teacher about the lesson and the effects of work. Iqbal, Siddiqie and Mazid (2021) recommended that the grammatical form of the topic be diverse as it counteracts monotony and positively influences student activity. There is a dependence of the theme form on the dominant teaching method used during the lesson. The subject in the form of a declarative sentence or pronounced without a verdict most often corresponds to the passive method (teacher-centred method). The theme in the form of an interrogative sentence is typical for problem lessons, as it contains an issue that needs to be solved.

The authors looked at the theme lesson from different perspectives: affirmative or questioning sentence? The theme of the lesson is given at the beginning of the lesson, at the end, or during the lesson? The theme of the lesson comes directly from the curriculum, or the student provided his own topic? The results are presented in Table 1.

Table 1. Characterization of the themes of the lessons.

Total number of themes N=30	3 questions (2 problem questions) / 27 affirmative sentences
	among 27 affirmative sentences, 15 come directly from the curriculum, the student provided his own topic for 12 lessons; 1 of 3 questions comes directly from the curriculum.
	27 themes appear at the beginning of the lesson, 2 at the end, and 1 during the lesson.
Number of students, themes N=14	university supervisor, subjective assessment of the relevance of the lesson topic to its actual course: half of the topics are relevant to the course of the lesson; question was properly formulated, but covers only the experimental part of the lesson.

The lessons are based on the content of the curriculum. Students do not have experience creating their own interesting lesson theme and may not want to make a mistake. Formulating an interesting lesson theme also requires more time and a creative approach. It is possible that they attended their schools for lessons the subjects of which came from the curriculum; maybe they participated in lessons that did not have interesting topics or they just did not pay much attention to it. The main themes of the lessons were given at the beginning of the lesson. It is possible that it is related to the logical arrangement of the given form of the lesson scenario. A deviation from this rule may occur in a problem lesson when at the beginning of the lesson a problem is determined that the school students are to solve and at the end of the lesson the topic is formulated, most often in the form of a single sentence, which is typical for this type of lesson.

2. Engagement

The introduction to the lesson is one of the possibilities of engagement. Teachers used a proper introduction to inculcate interest, enthusiasm, and curiosity among his students for accepting the new lesson, and to make the student accept and adopt a new lesson, the following methods can be used. Participation of school students during the lesson as a key competency of the teacher.

Bolliger and Martin (2018) distinguished between three different levels of student engagement: a) school student – school student engagement: This includes activities such as discussion boards and other various ways of sharing experiences and resources between students; b) school student – teacher engagement: This focuses on communication between the teacher and the student in the school, which is an important predictor of student success and achievement; c) school students – content engagement: This consists of the organization of instructional materials and planned activities, which is another component of participation crucial to student success.

The teacher should refer to the notice around us; give examples from everyday life. The usefulness of knowledge in everyday life should be shown to introduce the

topic of the lesson. We know that the brain likes challenges; emotional bonds appear. It is a good starting point to present a problem and involve school students to find a solution to the problem. The proposals for school student engagement found in lesson scenarios are presented in Figure 4.

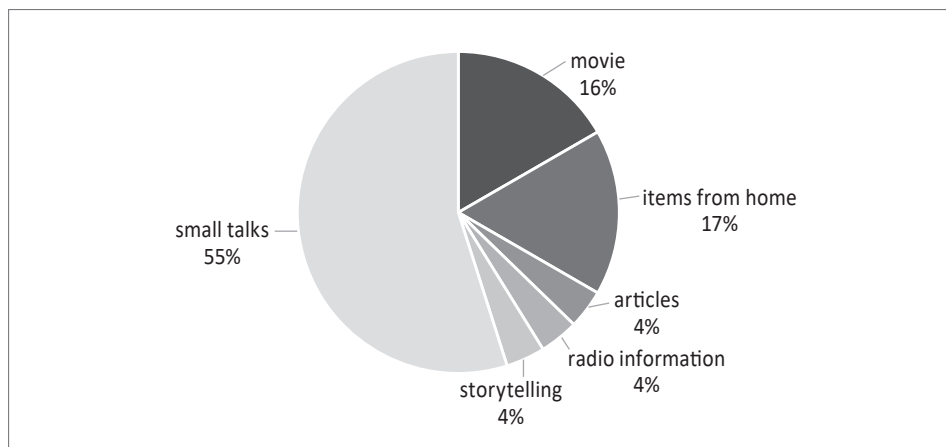


Figure 4. Different ways of engaging school students and the frequency of their appearance

The dominant form of interaction was small talks. The analysis of the lesson scenarios shows that interesting questions were used during the discussion. The next paragraph covers the topic of asking questions which play an important role in the teaching-learning process; stimulate students to be active during lessons (Chin, 2004). University students also used items from home to start an engaging discussion, as well as movies or sometimes only movie parts. Information from radio and television was used to illustrate the usefulness of knowledge and engage students in finding solutions. All proposals allow for the implementation of contextual learning (Pekdag and Le Maréchal, 2010; Christensson and Jesper, 2014). It is worth emphasizing that elements of storytelling have appeared (Collins, 1999).

3. Questions

Today, education underscores the value of asking good questions. An effective question is one way to engage students. In our opinion, a good teacher asks good questions of his students. The character of questions directed to students and the way the questions are asked played an important role in a properly planned lesson (Aizikovitsh-Udi and Star, 2011). Asking questions maintains communication between students and between the student and the teacher. Communication during the lesson should be two-way and influenced by appropriately formulated questions. School students are more likely to understand new material if they ask questions. The teacher must give school students the opportunity to ask questions. A study found that when elementary school students were taught to ask questions during

science lessons, they could discuss what they had learned on a more complex level (Spenser, 2017). Teach students to ask questions so that they understand the material at a level that goes beyond mere memorization.

What interest us? How many questions appeared in the lesson outline (scenario)? Which interrogative particles were used in the questions? Was the question supposed to support the student’s statement? Was the question a concluding question?

Figure 5 presents different question particles and their frequency of occurrence among the total of 286 questions.

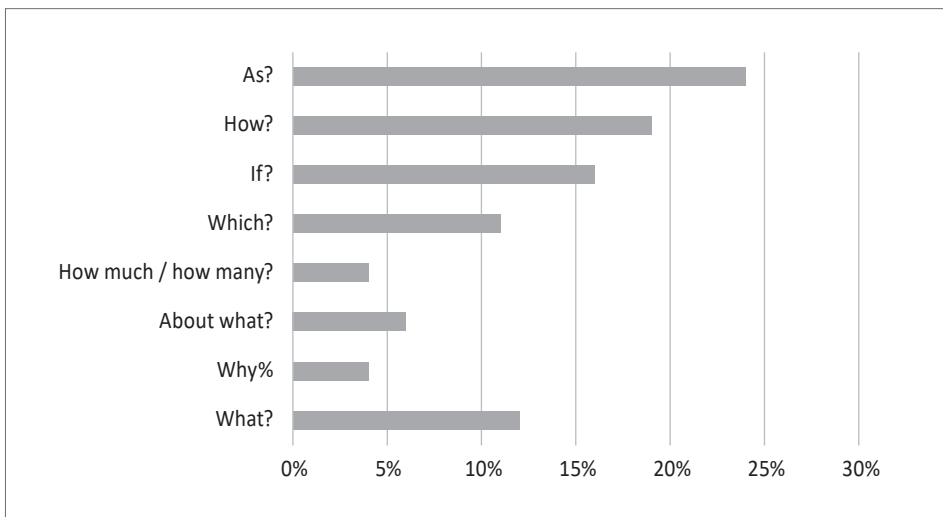


Figure 5. Frequency of occurrence of question particles

Some selected questions are presented in Table 2 below; in particular, those whose question particle changes in the English translation.

Table 2. Chosen examples of questions.

The interrogative particle used in the question	Chosen examples
As? (on the graph)	What would be the result of the task if / what will be your first step / what was the result / what feature decides / how can this be done?
How?	How can this be solved / How often does this happen / How else can it be done?
If? (on the graph)	Do you know any other examples / do you know any other ways to get this substance / whether you really can use this substance / is that a good example / has anyone already solved / is the answer?
What?	What can prevent it / what are you doing now / what changed / what is incomprehensible / what you liked best / what do you see / what do you hear

Although the questions of why the particle only account for 4% of all the questions, it is nice that the questions with the particle 'as' and 'how' appeared in almost half of the total number of questions. These questions provoke thought and develop the ability to apply concepts in unusual situations. Conclusive questions yes or no (16%) were usually used in situations where the university student wanted to end a certain part of the lesson and wanted to move on to the next part.

Prospective teachers asked mainly procedural and factual questions to make sure that they were doing the right thing as expected by the teacher. In our opinion, such a situation does not arouse curiosity or increase interest in the topic of the lesson.

The authors underlined that during lessons some interesting questions appeared that were not included in the lesson scenario: What have you learned by solving this problem? What do you need to solve this problem? What makes you think that way? What will change when...? Or the same statements: It is interesting that you saw it this way... It is interesting that you noticed... The ad hoc questions created by university students (teachers) were not only to sustain the discussion, but also to stimulate critical thinking.

Students want to discuss how to maintain two-way communication, stimulate critical thinking in school students, and use their creativity. However, the lack of face-to-face interaction with the student as a teacher and the increased response time to answer questions can be challenges for online learners and teachers (Adnan, 2020).

Chin (2004) proposed: Teaching students categories of question types can make them aware that different types of questions elicit different thinking processes that help build answers in different ways, which can lead to insight.

4. Recapitulation

The summary part of the lesson is needed. The lesson must be recapitulated to consolidate the new knowledge taught to the students in their minds. Here, the teacher will recapitulate the lesson by giving a task and asking some questions to the students. Recapitulation exercise should be done so that whatever has been taught to the students until now can be retained in their brains. These tasks bring attention in the class, give motivation to students, helps understand the student limitation, helps the teacher to know in which part student could not understand or what teacher has to teach again, helps to start new topic by relating their previous knowledge or recall the previous knowledge.

The total number of tasks during the recapitulation part was N=36%. 25% of the tasks represented closed tasks in a form: true or false, but the rest are open tasks. Figure 6 shows different forms of tasks and their frequency of occurrence.

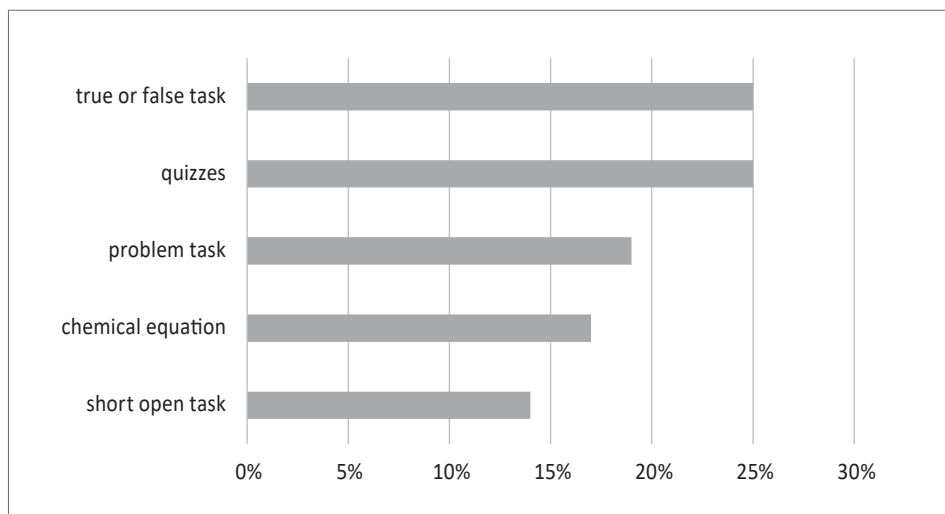


Figure 6. Frequency of occurrence of different forms of tasks

In the case of online learning, the use of gamification elements can maintain the student's attention and concentration, as well as for the purpose of explaining, organizing, and clarifying. Usually a few minutes are allowed for recapitulation; hence, the choice of true or false tasks seems very reasonable. Recapitulation must be based on simple and concrete questions to quickly assess the understanding of the most important concepts. When analyzing the results, it can be seen that the students used types of tasks that can be successfully completed and discussed during online lessons. If they proposed open tasks, the tasks were concrete and short.

Among the total number of questions that appeared in 30 analysed lesson scenarios, 9% of the tasks were used during recapitulation. There was no question why; most were questions with a particle which. This fact can be an indicator of a good use of time for recapitulation.

5. Homework

The last but very important part of the lesson is homework. Home assignments should be given to students related to that lesson. Why do homework? Cooper, Robinson, and Patall (2006) wrote homework teaches students to work independently. Homework teaches students the importance of planning, staying organized, and taking action. Moreover, a well-designed homework task can strengthen classroom learning by posing challenges to the student, who will thus gain better understanding of the essence of the matter and further develop their ability to apply theoretically gained knowledge in practice (Marković, Randjelović and Trivi, 2010).

Many university students prepared their own tasks for homework; only 34% of the tasks were taken from the workbook. In most cases (92%) tasks were open tasks: not only, for example, write chemical formula, write specific physical-chemical

properties, solve calculating tasks, but also tasks that require critical thinking and deep understanding of the topic. Explain this situation, analyse this situation, compare, design an experiment allowing, write an explanation of your choice, here are some example commands for tasks. The use of open tasks for homework is justified – school students have much more time to think about the problem and find a solution. However, open-ended tasks show the teacher how students cope with the application of the acquired knowledge in the lesson. Open-ended questions create a habit of thinking, and questions must be individualized according to the students' abilities, from simple to complex. The closed tasks used represented two forms: true or false and matching (Boyd, 2012).

Task commands were analyzed in the context of the taxonomy of Niemierko's learning goals (Niemierko, 1999). Niemierko recommended four levels for learning objectives: A, memorizing information; B, understanding information; C, applying issues in typical situations; D, applying issues in new or problem situations. The results are presented in Figure 7.

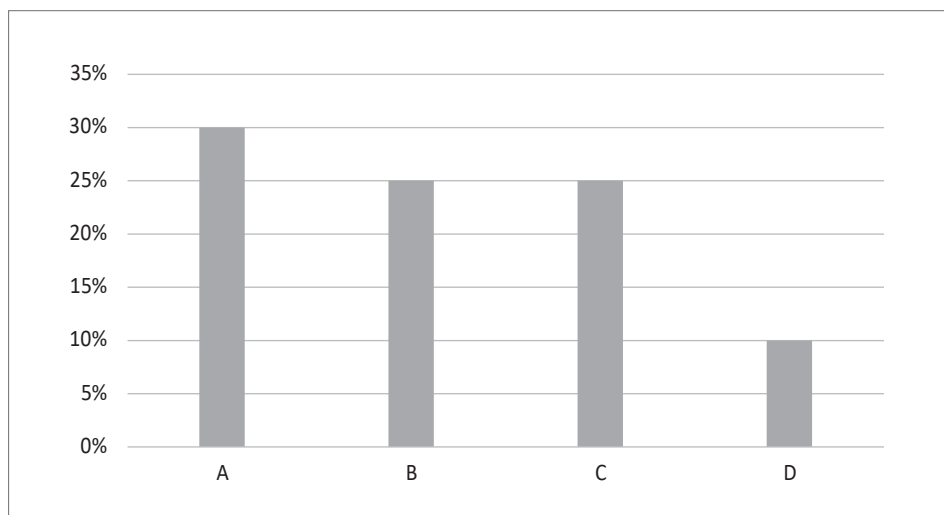


Figure 7. Frequency of occurrence of commands tasks in the taxonomy of learning objectives

The results obtained clearly underline the importance of testing reasoning skills and using the acquired knowledge in various situations.

Conclusions

It is obvious that teaching an online class is different from teaching in reality. The lack of face-to-face interaction with students and teachers, increased response time for engagement, time for answering questions, time for solving problems can be challenges for young teachers (Adnan, 2020). The conduct of online lessons was

a surprise for the students; no one was prepared for this. Students had to create their own online work model based on self-reflection, developed intuitively and often using the trial and error method. How to start cognitive processes? How do we involve the student in the lesson? These questions have completely different meanings in distance learning.

The main objective of this study was to recognize difficulties in planning and conducting a chemistry lesson at school and to recognize areas requiring support in the next part of the pre-service teachers training. Issues that require support include developing the ability to ask questions, construct both low-order and higher-order questions, formulate interesting lesson themes, learn new forms of engaging students, and recapitulating (Brown, 2021). Perhaps because school practice took place remotely, the students could not fully demonstrate their skills. It is also important to use new ways of communication and new ways of distribution of knowledge. All these activities should be carried out in a conscious manner. Important for improving the effectiveness of education is also that future teachers are aware of the many blocking factors for learning.

Additional information:

The analysis of the lesson plans was carried out by Agata Augustynovič as part of the distance internship at the Faculty of Chemistry Jagiellonian University in Kraków.

References

- Abell, S.K. (2008). Twenty years later: Does pedagogical content knowledge remain a useful idea? *International Journal of Science Education*, 30(10): 1405–1416.
- Adnan, M., Anwar, K. (2020). Online learning amid the COVID-19 pandemic: student perspectives. *Journal of Pedagogical Sociology and Psychology*, 2(1): 45–51. <https://doi.org/10.33902/JPSP.2020261309>
- Aizikovitsh-Udi, E., Star, J. (2011). The skill of asking good questions in mathematics teaching. *Procedia–Social and Behavioral Sciences*, 15: 1354–1358. <https://doi.org/10.1016/j.sbspro.2011.03.291>
- Aglazor, G. (2017). The role of teaching practice in teacher education programmes: Designing framework for best practice. *Global Journal of Educational Research*, 16(2): 101–110.
- Ball, D.L. (2000). Bridging practices: Intertwining content and pedagogy in teaching and learning-to-teach. *Journal of Teacher Education*, 51(3): 241–247.
- Bereźnicki, F. (2007). *Dydaktyka kształcenia ogólnego*. Kraków: Oficyna Wydawnicza IMPULS.
- Bolliger, D.U., Martin, F. (2018). Instructor and student perceptions of online student engagement strategies. *Distance Education*, 39(4): 568–583. <https://doi.org/10.1080/01587919.2018.1520041>
- Boyd, M.P. (2012). Planning and realigning a lesson in response to student contributions: Intentions and decision making. *Elementary School Journal*, 113(1): 25–51. <http://dx.doi.org/10.1086/665817>

- Brown, W.S. (2021). Successful Strategies to Engage Students in a COVID-19 Environment. *Frontiers in Communication*, 6(641865). <https://doi.org/10.3389/fcomm.2021.6418652>
- Bucat, R. (2005). Implications of chemistry education research for teaching practice: Pedagogical content knowledge as a way forward. *Chemistry Education International*, 6(1): 1–2.
- Burewicz, A., Gulińska, H. (2002). *Dydaktyka chemii*. Poznań: Wydawnictwo Naukowe UAM.
- Caires, S., Almeida, J., Vieira, D. (2012). Becoming a Teacher: Student Teachers' Experiences and Perceptions About Teaching Practice. *European Journal of Teacher Education*, 35(2): 163–178.
- Cooper, H., Robinson, J.C., Patall, E.A. (2006). Does homework improve academic achievement? A synthesis of research, 1987–2003. *Review of educational research*, 76(1): 1–62. <https://doi.org/10.3102/00346543076001001>
- Chin, C. (2004). Students' questions: Fostering a culture of inquisitiveness in science classrooms. *School Science Review*, 86(314): 107–112. <https://repository.nie.edu.sg/bitstream/10497/4741/1/SSR-86-314-107.pdf>
- Chong, S., Low, E. (2009). Why I want to teach and how I feel about teaching- formation of teacher identity from pre-service to the beginning teacher phase. *Educational Research for Policy and Practice*, 8(1): 59–72. <https://doi.org/10.1007/s10671-008-9056-z>
- Christensson, Ch., Jesper, S. (2014). Chemistry in context: analysis of thematic chemistry videos available online. *Chemistry Education Research and Practice*, 15(1): 59–69. <https://doi.org/10.1039/C3RP00102D>
- Collins, F. (1999). The Use of Traditional Storytelling in Education to the Learning of Literacy Skills. *Early Child Development and Care*, 152(1): 77–108, <https://doi.org/10.1080/0300443991520106>
- Erlingsson, Ch., Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine*, 7(3): 93–99.
- Guskey, T.R. (1989) Attitude and perceptual change in teachers. *International Journal of Educational Research*, 13(4): 439–453.
- Iqbal, Md.H., Siddiqie, S.A., Mazid, Md.A. (2021). Rethinking Theories of Lesson Plan for Effective Teaching and Learning. *Social Sciences & Humanities Open*, 4(1): 100172. <https://doi.org/10.1016/j.ssaho.2021.100172>
- Junior, J.B.B. (2020). Assessment for learning with mobile apps: exploring the potential of quizizz in the educational context. *International Journal of Development Research*, 10(01): 33366–33371. https://www.academia.edu/download/62464841/Artigo_Quizizz_IJRS20200324-89180-79riqp.pdf
- Kirbulut, Z.D., Bektas, O. (2011). Prospective chemistry teachers' experiences of teaching practice. *Procedia Social and Behavioral Sciences*, 15: 3651–3655. <https://doi.org/10.1016/j.sbspro.2011.04.351>
- Krippendorff, K. (1980). *Content Analysis: An Introduction to Its Methodology*. Newbury Park, CA: Sage
- Kruszewski, K. (2004). *Sztuka nauczania*. Warszawa: Wydawnictwo Naukowe PWN.
- Krzeczowska, M. (2020). How Students – Future Teachers Identify themselves... with the Issue of Organic Reaction Mechanisms in the Context of Chemistry Lesson

Carried out at Schools. *Annales Universitatis Paedagogicae Cracoviensis, Studia Ad Didacticam Biologiae Pertinentia*, 310(X): 133–141. <https://bioAnnales.up.krakow.pl/article/view/8200>

Marković, M., Trivic, D., Randjelović, M.(2010). Practical Homework Assignments As Part Of Chemistry Teaching And Learning. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi*, 4(2): 69–78. <https://dergipark.org.tr/en/pub/balikesirnef/issue/3371/46527>

Niemierko, B. (1999). *Pomiar wyników kształcenia*. Warszawa: WSiP.

Pekdag, B., Le Maréchal, J.-F. (2010). Movies in chemistry education. *Asia-Pacific Forum on Science Learning and Teaching*, 11(1): 15. <https://hdl.handle.net/20.500.12462/9526>

Sancar, R., Atal, D., Deryakulu, D. (2021). A new framework for teachers' professional development. *Teaching and Teacher Education*, 101: 103305. <https://www.science-direct.com/science/article/abs/pii/S0742051X21000299>

Schulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researchers*, 15(2): 4–31.

Spenser, J. (2017, November). Helping Students Ask Better Questions by Creating a Culture of Inquiry. <https://medium.com/synapse/helping-students-ask-better-questions-by-creating-a-culture-of-inquiry-d1c4b0324a6f>

Weber, R.P. (1990). *Basic Content Analysis*, 2nd ed. Newbury Park, CA.

Appendix No. 1.

An exemplary lesson plan form (outline/scenario) with some comments

1. General Information

- a) The lesson theme
- b) Chemistry program carried out in school
- c) Level (primary, secondary)
- d) Type of lesson (current, revision)
- e) Time allocated to the implementation of the material contained in the outline

2. Objectives:

- a) Teaching and educational activities (we pay attention to the remaining messages from previous teaching levels, we correlate with other school subjects, and cross-curricular skills, key competencies)
 - Introducing students to...
 - Developing skills (performing experiments, making observations, drawing conclusions, etc...)
 - Introducing students to the new method of work...
 - Developing the ability to work in groups...
 - Awareness of dangers, dangers, etc.
- b) Operational – specifically what a student should know after a given lesson; written with measurable verbs, containing all the material of the lesson; some can be done in the form of homework

3. Teaching Methods:

- a) Verbal:
 - Stating: talk, story, lecture, description
 - Searching for discussion, working with the text, case method, role method, calculation exercises, didactic games, etc.
- b) Viewing: demonstrations (of experiments, charts, models, transparencies, multimedia presentations, didactic films, visiting museums, etc.)
- c) Practical: independent experimental work of students, modeling (models of molecules building)

4. Teaching Aids: All things/materials students need to conduct the lesson**5. The course of the lesson:**

- a) **Related part**
 - Treated as a reminder of the issues (e.g. homework control, questions to the student, tasks for a piece of paper)
- b) **The main part**
 - Introduction to the topic, which makes students interested in the topic (element of the 5E model)
 - The course of the lessons
 - proper selection of the quantity and quality of the material;
 - logical order;
 - description of teacher and student activities (teaching methods/teaching principles)
 - a marked note (i.e. you know from the outline what the student will have in the notebook after the lesson)
 - correctly described chemical experiments;
 - all teaching material (e.g. properties, definitions, applications, written equations, solved tasks, etc.)
- c) **Summary (recapitulation)**
 - summarizing and organizing the most important content from a given lesson;
 - check the achievement of goals;
 - variety of forms, e.g., rebus, logograph, tasks in the student's worksheet,
- d) **Homework**
 - the entire content of the task with a solution and a short justification of the goal.

What if... – planning and implementing lesson scenarios during online school practise**Abstract**

Active participation in school practice is a solid foundation for future teaching. A case study was used in which 15 preservice chemistry teachers from Jagiellonian University were involved. The purpose of this study was to find some difficulties in planning and conducting

a chemistry lesson at school and to recognize areas requiring support and further development. Formal documents – lesson scenarios were used to obtain the quantitative data.

Based on these scenarios, students conducted virtually their own lessons at school. The results revealed that the understanding of some elements of PCK-topic specific knowledge and PCK-pedagogical knowledge was poor; it should be developed and completed during the next courses of pre-service teachers training.

Key words: chemistry education, school practise, lesson scenario, online lesson

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