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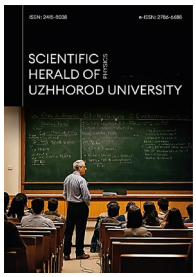


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# Models for establishing subject-specific competencies for chemistry teachers

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## Abstract

**Relevance.** The teacher is the main component of the learning process in the school, determining students' academic success so that students can develop their potential under the teacher's guidance. When implementing learning, the teacher should be able to create a learning environment that is supportive and engaging to guide learners towards the optimal accomplishment of their learning objectives.

**Purpose.** Purpose of the study: to explore and describe models of subject competence development for chemistry teachers.

**Methodology.** A systematic review can be explained as a research method and process for identifying and critically evaluating relevant studies and for collecting and analysing data from those studies.

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**Results.** The seminars demonstrated various perspectives for our future chemistry teachers, but also considered the needs of the student teachers - as they were also part of the development team. Previous experiences have been highly successful, and teacher involvement in university development has proved beneficial to both school education and teacher training programmes. Science teachers can learn new and practical elements of chemistry education as they develop. Thus, the model can serve both for teacher training and the continuing professional development of teachers. This study presents an advanced collaborative action research model for the development of seminars for university teachers. The focus of the advanced model is the establishment of a development team. The model itself and an example of the development of one seminar are described.

**Conclusions.** The advanced model provides new opportunities for developing seminars that combine theoretical knowledge and practical experience. In general, even if following this model involves much more work for the lecturers, the positive experience outweighs the effort expended. Additional learning strategies and materials for the university were developed based on this model.

**Keywords:** chemistry teacher training; teacher competencies; chemistry teacher competencies; subject competencies.

## Introduction

Quality human resources are essential for the development of a nation, and the availability of quality human resources is a major key to the success of the development. To ensure quality people and society, the world of education, especially schools, must play an active role in improving the quality of human resources. Training is expected to produce a high-quality and highly competitive human resource that can withstand competition in the current era. The efficiency of the learning process is demonstrated by the results of the learning process and indicates the quality of the learning process that occurred. Quality education will improve the quality of human resources [1].

The government has made various improvements to maximise the results achieved in education, such as curriculum revision on an ongoing basis, a subject discussion programme for teachers, teacher working groups, partnership programmes between schools and educational institutions, professional development for teachers and lecturers. projects and many other programmes are being implemented to improve learning results [2]. One of the improvements the government has made about the curriculum is the change from syllabus to the curriculum. The curriculum has components with a new concept, which is an improvement on the curriculum. The realisation of quality education is influenced by many things included in the education system itself, one of which is the teacher factor [3].

The teacher is the main component of the learning process in the school, determining students' academic success so that students can develop their potential under the teacher's guidance [4]. When implementing learning, the teacher should be able to create a learning environment that is supportive and engaging to guide learners towards the optimal accomplishment of their learning objectives [5]. The teacher is the educational agent, thus the learning process can proceed in the classroom. The teacher's role in education – as teacher and educator. The teacher's role as a teacher is to provide students with ways of learning. The role of the teacher as an educator is more interpreted as the task of the teacher to set an example and tell the students to do the same [6]. The teacher is responsible not only for providing teaching material to the students but also for establishing spirituality, noble character, personality and skills. In addition, teachers should also prepare to learn management, such as teaching materials, assessment tools, implementation plans, quizzes, reports on student learning outcomes, and design their abilities through professional development, training, seminars, workshops or discussions, reading books or other information media [7; 8].

Diagnostic competence is one of the core competencies that future teachers in general and future chemistry teachers, in particular, should have. This competence is necessary whenever someone is handling heterogeneity, lesson design models and individual support issues [9-11]. In general, diagnostic competence is described as knowledge about students' learning conditions, their social skills and their assessment of any other students' activities in the classroom. It is also essential for appropriate diagnosis of students' learning conditions, including any barriers to successful learning. The results of the diagnostics and observations help chemistry teachers to design their lessons and consequently to analyse and develop their lessons. Described diagnostic competence as being based mainly on the following areas of knowledge: conventional knowledge, technological knowledge and knowledge of the change. Conventional knowledge is the knowledge of one particular person's background, of any influences that affect the personal experience, and of those that cause particular behaviour. In addition, this also includes knowledge of such effects and their possible manifestations in a particular investigation. This field of knowledge includes aspects of heterogeneity and diversity. Technological knowledge includes the ability to decide on the most appropriate methods of data collection and analysis for diagnostic questions. Finally, knowledge of change refers to any knowledge that allows the teacher to apply strategies related to changing the learning experience and/or behaviour of all those involved in the interaction [12].

Thus, diagnosis is an essential and central issue in the work of teachers. It becomes even more complicated in a broader and more complex structure of learning and teaching. As the significance of diagnostic competence increases with the corresponding increase in diversity and heterogeneity in schools, there is a need to incorporate diagnostic competence into higher education courses. Purpose of the study: to explore and describe models of subject competence development for chemistry teachers.

## Materials and Methods

A systematic review can be explained as a research method and process for identifying and critically evaluating

relevant studies and for collecting and analysing data from those studies. The purpose of a systematic review is to identify all empirical data that must meet predetermined inclusion criteria to answer a specific research question or hypothesis. Through explicit and systematic methods in examining articles and all available evidence, prejudice can be minimised, thereby ensuring reliable results on which to base conclusions and decisions.

Meta-analysis is a statistical method of combining the results of various studies for weighting and comparison, and for identifying patterns, disagreements or relationships that appear in the context of several studies on the same subject. In the meta-analytic approach, each primary study is abstracted and coded, and the results are subsequently converted into a general metric for calculating the overall effect value. However, to be able to perform a meta-analysis included studies must have general statistical measures (effect size) to compare results. Thus, it is complicated to perform a meta-analysis of studies using various methodological approaches.

After conducting a literature review and selecting a final sample, it is essential to consider how the research will be used for the relevant analysis. Thus, once the final pattern has been identified, standardised means of abstracting the relevant information for each item should be used. Extracted data can be in the form of descriptive information, such as authors, years of publication, subject or type of study, or in the form of effects and results. It can also take the form of a conceptualisation of a particular idea or theoretical opinion. Notably that this should be done by the purpose and research question of the particular review, and the form can vary. At this stage, it is crucial to consider training reviewers to avoid any variation in coding and abstraction (if more than one) and to closely monitor data abstraction during the review process to ensure quality and reliability. Frequently, if the purpose is to publish in an academic journal, this requires a detailed description of the process or a reliability assessment between reviewers. Occasionally this is easy to do with interesting information, such as the general population, effect size or sample size. However, it becomes more complicated when the subjects of literature, perspectives or historical chronology are of interest. this requires a detailed description of the process or a reliability indicator between reviewers. Occasionally this is easy to do with interesting information, such as the general population, effect size or sample size. However, it becomes more complicated when the subjects of literature, perspectives or historical chronology are of interest. this requires a detailed description of the process or a reliability indicator between reviewers. Occasionally this is easy to do with interesting information, such as the general population, effect size or sample size. However, it becomes more complicated when the subjects of literature, perspectives or historical chronology are of interest.

## Results and Discussion

Teachers as professional educators have a good reputation and become role models for the surrounding community. To be a role model and is one of the main roles of a teacher, both for themselves and for their students, because the teacher is the person who explicitly establishes and guides the students' future. The teacher is the component that most determines the quality of education because the teacher is responsible for developing and applying the curriculum and making learning meaningful for students. In recent years, however, teachers have seen a decline in their professional reputation and low results in competency tests. It is an interesting discourse that needs to be studied and explored so that teachers can reclaim their professional image and experience increased competence [13].

Teacher competence is the mastery of the objective (teaching and learning), the skills, attitudes and understanding necessary to support the success of the undertaken learning process. Currently, there is a great necessity to develop teacher competence as a crucial element in the learning process. With advances in science and technology, both in education/learning and those specifically connected to the material being taught, the knowledge and technology controlled by teachers must continue to develop. It is not enough for teachers to simply use textbooks to teach students, supporting tools/learning materials also need to be used [14; 15]. Competence is the experience or ability that teachers have in mastering knowledge, skills, values and attitudes in performing their duties and responsibilities, which includes professional, educational, personal and social competencies. The development of competencies that teachers possess can improve student learning results [16].

Professional competence is the ability of teachers to deepen learning material and guide students so that they can comply with national educational standards. Aspects of teachers' professional competence include: (1) teachers master instructional materials, (2) teachers can process teaching and curriculum, (3) teachers can manage classrooms, (4) teachers can use media and learning resources, (5) teachers master the basics of education, (6) teachers can manage the interaction of teaching and learning, (7) teachers can assess student achievement, (8) teachers are familiar with service and service counselling guidelines, (9) the teacher knows and can manage the school and co-operate in classroom management in an organised way, (10) the teacher can do educational research.

The previous study established that the professional competence of a chemistry teacher influences the laboratory teaching skills of students, the higher the teacher's professional competence, the higher the student's laboratory teaching skills. Other studies have concluded that professional competence has a strong positive impact on the professionalism of teachers. Considering the importance of teacher professional competence for both enhancing teacher professionalism and improving student learning results, it is necessary to conduct this research [17; 18]. Starting from the above problems and pitfalls that a strictly one-disciplinary approach encounters, the development team had to be redesigned. To ensure that the researcher does not have a dual role, more university teachers need to be involved in the development. Other subject disciplines and closely connected areas of research regarding the issue should be integrated into the development team. The chemistry teacher who will lead the seminar acts as a practitioner in the original model. This person knows the old course well and has found a problem in his teaching that needs to be solved or minimised. The various experts in the group have various

and more in-depth understanding and knowledge of different aspects of the subject. In addition, this group has a great amount of theoretical knowledge. Other people involved bringing new practical and theoretical knowledge, thereby improving the general understanding of new methods, theories and opinions on the development process. Due to this expansion, subjective theories can influence the development of materials, and these theories exist in conjunction with scientific theories. Thus, both types of chemistry teachers' theories can influence each other and lead to unexplored results. Particular subjective theories are activated by particular actions, and these (along with other factors (e.g. emotional aspects of problems)) influence participants' actions, behaviour and practical work. This allows theories to influence development. Moreover, attitudes and subjective theories vary among chemistry teachers because they depend on personal, practical experience. Finally documented the modification of practical knowledge during this process, which improves all teaching methods of the participants. Thus, teachers of similar disciplines (biology, physics) should be included in the development process [19-22].

Diagnosis and heterogeneity are generally less concentrated in the teaching of chemistry and chemistry; they are more likely to be found in the disciplines of teaching or special needs education. It excludes the involvement of teachers in language learning, teaching or inclusive education. The involvement of researchers outside the field of science education should be adapted to the problems. This type of group is closer to the original model because such people have more in-depth knowledge of diagnosis and heterogeneity, two subjects that are both relative newcomers to chemistry education. Moreover, experience and attitudes towards teaching can also have a positive impact on the development process. Language plays a crucial role in acquiring knowledge and facilitating communication when learning science. Thus, linguistic and language promotion aspects should be integrated into chemistry teacher training programmes. Consequently, this means that German teachers and professors of German as a second language are actively involved in the development team.

Also, describe the discrepancy between teachers as practitioners and researchers as educational theorists. He concludes that teacher training programmes need to respond to this mismatch. Both opinions need to be considered in education. Teachers have the general teaching knowledge to design and plan lessons, which depends on their personal experience. On the one hand, this knowledge also means organisational and methodological knowledge for particular actions in the classroom; on the other hand, it includes specific strategies and methods for lesson planning. Teachers also have certain beliefs and attitudes about learning and teaching. In addition, teacher-aspirants encounter this in school during their final teacher training course. It ensures that they are not overwhelmed by real-life learning situations and facilitates the transition from study to everyday life. This process should also be actively supported by university professors. It can be accomplished by including teachers' opinions, beliefs and subjective theories in the university curriculum. Thus, qualified teachers should also be involved in the development of higher education teacher training [23].

Finally, student teachers themselves should be involved in the development of their education. The trainee teachers have the same role as the students in the original model, and consequently, they support the testing of the developed university materials in their classrooms. In Kazakhstan, university students have rarely or insufficient contact with their professors. Their courses are rarely adapted to the needs and views of the students. In addition, the objective of student teachers is not only to test new materials in the university. It also entails reflecting on these materials and providing personal feedback on them. Trainees should enhance the overall picture presented in the materials, provide feedback to the entire group and initiate quick interventions in the development process. Student teachers are an integral part of the development team. Since such a diverse set of teams must be derived from theory, the available resources have a significant impact on the development process. It allows two opposing fields of knowledge to be combined. Other significant aspects include the synthesis of teaching experiences, the incorporation of intuitive action skills, the use of unlimited creativity and the use of the diverse academic knowledge of the people involved.

The idea of a cyclical process and a multi-stage development process with four phases to establish university courses has also been adopted. It involves the initial problem being discovered by the chemistry teacher, who is also the teacher of the chemistry course. To ensure that the problem is not just a one-off situation, and to ensure that solving the problem is of general interest, the experts first discuss the problem [24]. At the beginning of the process, the development team consists of chemistry teachers, chemistry teachers and teachers from other scientific disciplines. A review of the relevant literature should also be conducted. These first two steps of initiating the development process are also described. A literature review is ongoing during the entire development process. All information obtained is provided to the entire research team. At the same time, student teachers also discuss the problem to ensure that it is also visible in everyday practice on their part [25].

Development is the concept and knowledge for the development of educational practice and the development of particular practice through the research process. In addition, a positive development in teaching practices is of fundamental interest to the existing model. Problems identified in current practices should be minimised or even solved over several cycles through step-by-step changes in practices. Cooperation between two types of groups is essential: practitioners (chemistry teachers) and researchers (chemistry professors) [26-28].

There are several various models of action research. Divide action research models into three types and described three new types. Moreover, these types of action research are connected to a real research perspective:

1. Scientific and technical view of problem-solving: the researcher provides leadership in the essential part of the development process and brings new ideas to the process (e.g. research question, strategies, new materials). In addition, the researcher is confronted to evaluate the "new" practice. Here, practitioners are eager to help the researcher and test the materials in everyday practice.

2. Practical action research: all people involved are increasingly cooperating in the development process. Practitioners are involved in development and testing. Here, the researcher is just beginning the development process with a problem from teaching practice.

3. Exploring critical-emancipatory action: practitioners and researchers have equal rights, but practitioners assume the leading role in the main part of the development process. The researcher is more a development support tool, while practitioners are involved at all stages of the development process. Consequently, the problems come straight from the practitioners themselves [29].

The collaborative action model refers more to the second type of research mentioned above since practitioners and the researcher are equal, but the initial question from the researcher initiates all actions in the design process. The authors argue that the development team and objectives in the group can vary over time, as can the type of action research. The various features of people have an impact on the development of materials. Thus, they are a combination of various teaching experiences, didactic and methodological expertise, knowledge of the learning process and creative abilities.

The development team should be established based on the original issue and the competencies or skills required to solve the problem. Thus, team building represents a core part of the advanced model. Not all team members are actively involved in testing the materials. Therefore, some individual members assume collaborative advisory roles in the development team. However, it is essential for the development process that all issues that emerge during the development process are available to the entire group. Chemistry professors, chemistry teachers and teachers of chemistry students are always involved in the development and thus establish the core of the team [30-32].

Team building has become a central part of this model because the people' composition has changed noticeably. Thus, the team is established before the cyclical development process begins. The decision on which experts to invite to the team depends specifically on the question posed [33]. Once the team has been established, the development of the training module, the materials and the cyclical development routine begin. The courses will be progressively updated and modified, which will minimise and possibly eliminate the problem, of course. Change and development can contribute to new media approaches and suggestions. General knowledge and experience about the general processes of learning and teaching at university are collected. The team starts to develop particular materials through a communication exchange. It produces pre-training materials and teaching materials that are then used in practice at the university. The development team plans the practical use and selects the type of practical experience to be considered in the development process. After testing, each of these steps is analysed and evaluated. As in the case of the secondary school context model, an appropriate assessment method is also selected for the university model. Collected information, teachers' practical experience and the overall success or failure of lessons all need to be considered in the process of further development. New problems may emerge during the reflection phase, which includes the establishment of a new team and starts the process from the beginning. Thus, new challenges may require new members of the development team [34].

The development process results in new teaching materials, media and methods for university lessons, but materials for secondary schools may also emerge. The seminar problem has been reduced or eliminated, triggering the development process again. In addition, the group get a lot of documents and reflective experience of teaching at the university. The original model claims that teachers can also learn through development. For the new model, this means that all shareholders can learn something from each other. This describes only part of the final design result [35]. A professional competence analysis of teachers is essential to help teachers reflect on the extent of their professional competence. The results indicated that teachers already have good professional competence, although there are still some things that need to be improved. Teachers need to improve their professional competence: time allocation in the delivery of each material, development and optimal use of teaching tools, use of various methods and approaches, and use of the Internet to support learning. Teachers should prepare well for the classroom so that students can learn well [36]. Up to this point, the recently developed model has been described for the general development of university chemistry courses. The general description helps to adjust the model to an older version. In addition, the development team has sufficient freedom in the development process so that the process is not restricted [37].

The following example demonstrates the process of developing and using the current model. This example concerns linguistic heterogeneity in chemistry with a concentration on reading strategies. One chemistry teacher noted that student-teachers need knowledge of tools to help their future students read and understand scientific literature (including worksheets). Chemistry teachers named various problems they had observed in their pupils when reading science texts. In the first stage, the development team (a chemistry teacher, a chemistry teacher and another science teacher) discussed the problem intensively. At the first meeting, the team identified several areas of issue. Chemistry teachers recognised the importance of this issue for their teacher training programme, especially for chemistry teachers. A literature review identified that German education teaches various reading strategies, but only for short stories, newspaper articles and longer texts. However, texts in science lessons are distinguished from these types of texts. This made it almost impossible to simply apply reading strategies to academic texts. For this reason, a researcher from the department was invited to join the team. The researchers explained the problems identified, including with the help of specific texts extracted from science teaching and examples from chemistry classes. Their first purpose was to develop reading strategies specifically for understanding scientific texts. Reading strategies from German education have been adapted to scientific texts [38; 39].

In the original Participatory Action Research model, the authors proposed to divide the development into three phases. Due to the problems of adapting the original model to the university level, a different division of the development phases was proposed at this stage. This was

also conditioned upon the limited number of teachers in the subject at university, especially in chemistry [40-42].

In the following phase, this technique was implemented in a university seminar for chemistry teachers. Then the seminar was evaluated by the use of a survey. The entire group thought about the seminar too. One of the main results of the reflection was that most student-teachers could not admit the necessity of a reading strategy in chemistry classes. Student-teachers frequently consider that it is not the responsibility of chemistry teachers to solve language problems. New materials have been developed; but a new problem has emerged that seems more fundamental [43]. The attitudes of student-teachers need to change. This adds another language teacher to the team. The purpose was to develop a seminar to explain linguistic heterogeneity. Finally, reading strategies were one of the many aspects of the seminar. The seminar was conducted in several stages and had the following structure:

1. Increase student teachers' awareness of language heterogeneity in chemistry classes (e.g. by reading and analysing specialised texts on business, economics or psychology; lecturing in English instead of German, etc.);
2. Acknowledgement of the problem based on authentic teaching material (working with material extracted from chemistry textbooks and analysing them with a focus on language heterogeneity in chemistry lessons);
3. Exploring reading strategies in science teaching (on-the-job exercises on various reading strategies);
4. Development of learning materials with reading strategies (integration of reading strategies into particular materials).

During the last group reflection exercise, which was conducted during a group discussion at the seminar using a Likert survey, the chemistry students who participated in the seminar gave feedback. They indicated that they now understood the necessity of specific reading strategies and that they would use them during their next school internship [44].

The first phase of the new model starts with team establishment, which depends on the problem and, therefore, on the competencies that individual team members should have. This initial group of developers is relatively small and can be expanded as needed during the development process. This stage concentrates on the problem, the "accessible content of the teams" and its "teaching content". It means that specific conditions and terminology need to be agreed upon. At the end of this stage, initial approaches and materials are developed. One specific feature of this phase is the very frequent, often significant, modification of media, materials and concepts [45].

In the second stage, the originally developed materials, media and concepts are differentiated, developed, tested and evaluated. Ideally, testing should be done by several groups of university courses. At this stage, the implementation of the materials is the main focus.

In the third stage, all newly developed materials are distributed. These materials can be used in further lectures or courses at other universities. Implementation at other universities allows for the redevelopment of materials and ensures parallel dissemination of materials and media to a broader group of participants. Ideally, this expansion could continue the establishment of university (or even international) networks exploring the same issues. In each of these three phases, the development process may consist of several development cycles (development, testing, evaluation, reflection) [46].

## Conclusions

Based on these models, the education system can improve interdisciplinary and inter-institutional networks. Participants can also learn from each other. One critique may be that the development culture with lecturers operating within their seminars may not be sufficient to achieve the stated purposes, since the lecturer is also a practitioner and researcher. One risk is that close personal involvement can cause participants to evaluate their courses only superficially. However, if this were true, they would also fail to benefit from the best teaching and learning methods and materials in their classrooms. Share ownership can also be a powerful motivator. It is considered that subsequent evaluation and gradual development of university courses is possible using this new model. It is also possible to acquire general knowledge and concepts that can contribute to the development of other university courses. For this reason, the model presented above helps to consistently optimise university training modules in chemistry courses. New seminars gave both theoretical and practical background to the subject. In addition, it was much easier to find a connection from one seminar to the other. Based on the experts on the development team, it can be said that the seminars provided various perspectives for future chemistry teachers, but also considered the needs of the student-teachers – as they were also part of the development team. To summarise, previous experiences have been highly successful, and teacher involvement in university development has proved beneficial to both school education and teacher training programmes. Science teachers can learn new and practical elements of chemistry education as they develop. Thus, the model can serve both for teacher training and the continuing professional development of teachers.

However, notably that working on this model is an additional, time-consuming objective for educators. In addition, lecturers need a willingness to change. This is a basic requirement for any development process. In addition, full-time teachers generally have less time to research and check further developments in university education. It is due to the extra time involved in lesson planning, teaching, grading, excursions and class trips. Therefore, one of the purposes of this ongoing project (in addition to enhancing the continuing professional education of chemistry teachers) should be to develop practical and appropriate teaching materials that can be used by volunteer teachers with limited time to participate in research. A fine follow-up to the development team was the involvement of student teachers in the development of their education. Courses should be adapted to the requirements, perceptions, performance and opinions of the students involved. Conversely, in the future, it needs to be determined whether student teachers need additional help to improve their ability to reflect on their educational training. However, in the authors' experience, the willingness of student-teachers to participate has been

enormous. Their feedback was, in and of itself, very constructive and helpful for future work.

This study presents an advanced collaborative action research model for the development of seminars for university teachers. The focus of the advanced model is the establishment of a development team. The model itself and an example of the development of one seminar are described. The advanced model provides new opportunities for developing seminars that combine theoretical knowledge and practical experience. In general, even if following this model involves much more work for the lecturers, the positive experience outweighs the effort expended. Additional learning strategies and materials for the university were developed based on this model.

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## Conflict of Interest
None.

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# Моделі формування предметних компетентностей для вчителів хімії

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**Анотація**

**Актуальність.** Вчитель є головним компонентом навчального процесу в школі, який визначає академічний успіх учнів, щоб учні могли розвивати свій потенціал під керівництвом вчителя. У процесі навчання вчитель повинен бути здатним створити сприятливе та зацікавлене навчальне середовище, щоб спрямувати учнів до оптимального досягнення їхніх навчальних цілей.

**Мета.** Мета дослідження: дослідити та описати моделі розвитку предметної компетентності вчителів хімії.

**Методологія.** Систематичний огляд можна пояснити як дослідницький метод і процес для визначення та критичної оцінки відповідних досліджень, а також для збору та аналізу даних з цих досліджень.

**Результати.** Семінари продемонстрували різні перспективи для наших майбутніх вчителів хімії, але також врахували потреби студентів-викладачів, оскільки вони також були частиною команди розробників. Попередній досвід був дуже успішним, а залучення вчителів до університетського розвитку виявилося корисним як для шкільної освіти, так і для програм підготовки вчителів. Вчителі природничих дисциплін можуть вивчати нові та практичні елементи хімічної освіти в міру їхнього розвитку. Таким чином, модель може слугувати як для підготовки вчителів, так і для безперервного професійного розвитку вчителів. У цій роботі представлено вдосконалену модель дослідження спільних дій для розробки семінарів для викладачів університетів. Основна увага в удосконаленій моделі приділяється створенню команди розробників. Описано саму модель та приклад розробки одного семінару.

**Висновки.** Просунута модель надає нові можливості для розробки семінарів, які поєднують теоретичні знання та практичний досвід. Загалом, навіть якщо дотримання цієї моделі передбачає значно більше роботи для викладачів, позитивний досвід переважає витрачені зусилля. На основі цієї моделі були розроблені додаткові навчальні стратегії та матеріали для університету.

**Ключові слова:** підготовка вчителів хімії; компетентності вчителя; компетентності вчителя хімії; предметні компетентності.