

Case Technology in the Process of Management of Student's Scientific-Research Activity

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Abstract: *Objective:* The need to develop methods of management of scientific – research activity using the case method is obvious in the framework of special education.

Background: The relevance of the studied problem is caused by the need to develop methods of management of students' scientific- research activity by means of cases.

Method: The leading method of the research of the given problem is the modeling allowing considering this problem as a process of purposeful and conscious mastering future expert's abilities to carry out monitoring of the quality of education.

Results: assessment criteria of results efficiency of vocational education, determination of the essence, and classifications of methods of scientific research are presented in the article. The empirical methods of the research, methods of the organization, and assessment of students' research activity are considered. The developed cases are directed for the successful management of scientific-research activity of students.

Conclusion: This research allows us to focus on the scientific-methodical provision of quality monitoring of education. Results can be used as an expansion of educational potential in the management process of students' scientific-research activity.

Keywords: Case-method, research experiment, new conditions of professional activity, pedagogical observation, activity in the education system.

INTRODUCTION

Understanding the case-method (case-study) as a method of analysing certain situations from methodological positions [1] in relation to the training of bachelors allows us to consider its educational potential much higher than traditional methods of training. The experience shows if traditional methods of vocational education in the higher school on the specialty 5B012000 – Vocational training provided with sufficient level of theoretical knowledge and competencies of graduates according to requirements of GOSO RK, then the main point of the case-method consists in that students are given an opportunity to comprehend the specific life situation in education-production environment, to realize ambiguity of its decision. It demands students with retarded mental development complex updating of knowledge in the studied knowledge domain subjected to assimilation to resolve specific pedagogical situations.

According to A.A. Abdukadyrov and B.Z. Turayev, the pedagogical situation, represents a pedagogical

process component, the pedagogical reality through which the engineer-teacher operates the pedagogical process and pedagogical system [1]. At the heart of the practice of inclusive education is the idea of accepting the individuality of each individual student. The structure of continuous systematic scientifically grounded support of a child and observation of its crises could serve as a means of improving the quality of the educational process. Case studies present opportunities for students to practice decision making, problem solving, collaborative work, and to analyze the results of their decisions. These are essential skills for professionals working with the complexities of special needs students [2]. The studies of teachers consider problems: case studies are used in project studies to analyze the phenomenon, to create hypotheses and to test the method [3], Using teaching case studies for management research [4], Using case studies in management education: the student perspective [5], The Case Study Technologies as the Means of Competency Building Approach [6], Case Study Teaching Method Improves Student Performance and Perceptions of Learning Gains [7]. The Case Study link between teaching and research [8, 9].

In the methodological vein, the case-method is presented in the form of a complex pedagogical system, integrating into itself a number of other

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methods of scientific knowledge [7]. Among them are methods such as the method of system analysis, thought experiment, problem method, modeling method, classification method, discussion, etc. Each of these methods, integrated into the case-method, is good in its place and plays its role in it in accordance with the educational task being solved. The understanding of their essence, the definition of diagnostic tools, criteria, and indicators of assessment of the studied pedagogical phenomena focus on adequate achievement of the planned results in the process of management of student's with retarded mental development independent work (SIW and SIWT) directed to resolving the revealed contradictions in the specific problem situation at the expense of which there is comprehended and mastered professional competences, development of their intellectual, cogitative, research and creative abilities. The purpose of the study is to determine the effectiveness of the implementation of the development of research abilities in students with special educational needs by introducing the case method into the learning process.

MATERIALS AND METHODS

The leading method for studying this problem is modeling, which allows us to consider this problem as a process of purposeful and informed mastery by future specialists who educate children with mental retardation of the skills to monitor the quality of special education. In the research process, the following methods were used: theoretical (analysis; synthesis; specification; generalization); diagnostic (questionnaire; interviewing; educational testing; method of tasks and assignments); empirical (studying the experience of organizations, regulatory and educational documentation; pedagogical observations); experimental (stating, formative, control experiments); methods of mathematical statistics and graphic representation of the results. The experimental base of the study is M. Auezov South Kazakhstan State University.

The research of the problem was carried out in three stages:

1. At the first stage, a theoretical analysis of the existing methodological approaches in the philosophical, psychological and pedagogical scientific literature on the problem was carried out, and also theories and techniques of pedagogical researches were studied; the

problem, the purpose, and research methods are allocated, the plan of the pilot study is made.

2. At the second stage, the cases were developed for formation and management of research activity of students, a complex of pedagogical conditions for effective formation of scientific-research skills of students with special educational needs were proved; the pilot testing was carried out, conclusions received during experimental work were analyzed, checked and specified.
3. In the third stage, the experimental work was completed, theoretical and practical conclusions were specified; the received results were generalized and systematized.

RESULTS

Introduction of the case-method assumed carrying out the following stages of experimental work:

1. the initial level of formation of research abilities of students using case-methods: testing, questioning, pedagogical observation and self-observation of teachers, statistical processing of research results;
2. development and introduction of case-methods to control knowledge, promoting successful functioning of the structural-functional model of formation of research abilities of students;
3. determination of level and identification of dynamics of formation of research abilities of students.

In total, the research covered 76 students with mental retardation, 3 teachers became direct participants in the experiment. An analysis of the diagnostic testing results allowed us to conclude that most students with special educational needs have both a low (57.3 %) and medium (21.4 %) level of students' formed research skills at the starting stage of the experiment. Low indicators identified in the motivational-value criterion were expressed in insufficient motivation for mastering research skills, achieving the quality of knowledge, misunderstanding and unconsciousness of the research's goals and tasks, its significance, and lack of need. Students did not know how to carry out the research work, did not know how to develop a research program, and set criteria and indicators for evaluating the exploring

materials, diagnostic tools, analyzing and processing information about research methods, and predicting change trends, evaluate results. During the research of the educational process, shortcomings in the work of the methodological service with teachers on the formation of students' research skills related to the predominance of passive working methods that do not allow building their own educational trajectories were revealed. 3 options of cases on discipline "Scientific research in vocational training" are given below.

Case A

The theme: Criteria for assessing the effectiveness of vocational training results. Learning objective: the systematization of students' knowledge about the essence of assessing vocational training results, mastering the criteria for assessing the quality of vocational training. Specific situation: If under the criteria (criterion "donkey is a sure sign for recognizing the truth" by V. Dahl [10]), we mean a significant, distinctive sign, on the basis of which an assessment, definition or classification of something is made, and a criteria-based assessment of the results of vocational education is a process based on a comparison of students' academic achievements in accordance with the goals and content of professional education, then what are the indicators of this process? What is their role, and how do they compare with the criteria?

Task 1: Analyze the given situation, reveal criteria indicators, on the basis of which the effectiveness of the results of vocational training is assessed, achieved by students with special educational needs in the process of mastering the educational program and their compliance with the planned results.

Task 2: carry out the analysis of literature and formulate definitions of the concepts "vocational training", "criteria", "criteria for the assessment of results of vocational training", "criteria-based indicators". Reveal the essence and content of definitions; argue justification of their treatment from the point of view in the short pedagogical essay.

Discussion of the ways of resolving the situation:

1. Discussion of the conceptual field of the problem and versions of formulations of initial concepts.
2. Justification of need of identification of assessment criteria of results of vocational training.

3. Discussion of the range of criteria indicators by which it is possible to evaluate vocational training results of students with retarded mental development (professional abilities, knowledge, skills and abilities, labor operations, professionally significant qualities, etc.).

Task 3: to develop 5–6 indicators according to a specific criterion (a criterion is chosen at the request of the student, for example, "Students' motivation for the perception of labor values", etc.), enter the data in the table and entitle it Table 1.

Table 1: Determining the Criteria for Assessing the Quality of Training

Criterion	Indicators

Case B

Theme 2: The essence and classification of methods of scientific research. Learning objective: systematization of knowledge about research methods in professional pedagogics and possibilities of their application. Specific situation: the success of any research depends largely on a rational choice of scientific methods for studying a pedagogical phenomenon. How to orient on the right choice of research methods, depending on the phenomenon being studied, what criteria should be followed?

Discussion on specific situations:

1. Research methods, unlike methodology, are
2. In science, several classifications of research methods are used (discussion of characteristics).
3. To the general scientific methods are referred
4. Specific scientific methods are ...

Task 1: To present a graphic scheme of general scientific and specific scientific methods.

Task 2: To prove in the notes of the practicability of application of the studied methods in the research of the specific pedagogical phenomenon (on the choice of a student), to formulate conclusions

Task 3: To develop 5–6 tests on the subject studied.

Case C

Theme 3: Methods of mathematical statistics: scaling, ranging, registration. Learning objective: mastering of knowledge about methods of mathematical statistics and possibilities of their application in the research practice of vocational training.

Specific situation 1: With the help of methods of mathematical statistics are defined average sizes of the received indicators: average arithmetic (for example, determination of the number of mistakes in test works of control and experimental groups); the median is an indicator of the middle row (for example, in the presence of twelve pupils with mental retardation in the group a median will be the assessment of the sixth pupil in the list in which all pupils are distributed on the rank of their assessment); extent of dispersion is the dispersion or an average quadratic deviation, variation coefficient, etc. The results processed by means of these methods allow showing quantitative dependence in schedules, charts, and tables [11].

The scientific results on studying significant professional qualities of the teachers who are to educate children with mental retardation received by the scaling method are shown in Table 2. The essence of the level of expressiveness of this or that quality of the teacher's identity is defined with the help of a five-point rating scale and the sum of estimates for separately taken quality. Each quality is estimated by the corresponding point from 1 to 5. The point "5" means the manifestation of this quality constantly and to a high degree.

The point "4" is put if the quality is well expressed and is often shown. Point "3" – if the quality is

expressed indifferently and quantity of expression and not expression is shown in equal shares. Point "2" – if the quality is expressed poorly and is seldom shown, point "1" – quality is not formed.

Task on situation 1: Analyzing the Table 1 formulate the essence of the scaling method, define its place in classification, enter conclusions in the abstract and prove how is determined quantitative characteristics of separate quality expressiveness by the sum of estimates.

Specific situation 2: Consider Table 2 and define the rank place which is allocated by students at self-assessment of formalness of the professional-pedagogical, all-professional, and special qualities and to specify the rank place allocated to each quality.

Task on the situation 2: Define the method of scientific research used in this table. Formulate its definition [12]. Entitle Table 3. Enter conclusions in the abstract.

Specific situation 3: on the basis of the analysis of literature gives the characteristic to the "registration" method and possibilities of its application. Usage of educational potential of cases in the management process of scientific – research activity of students with special educational needs, promotes positive motivation of activity of the teacher and the student, the choice of the forms of behavior, adequate to moral standards and rules of interpersonal communication.

Case D

Empirical methods of the research. Theme: Observation. Learning objective: formation at students with special educational needs presentation about empirical methods of the research and observation, as

Table 2: Level of Development of Professionally Significant Qualities of the Teacher who are to Educate Children with Mental Retardation Determined by the Scaling Method

Quality groups	Levels		
	low	average	high
Moral and ethical	Less 17	18 – 22	23 – 35
Social	-// 27	28 – 35	36 – 40
Professional and pedagogical	-// 24	25 – 31	32 – 35
Pedagogical	-// 17	18 – 22	23 – 25
All-professional	-// 20	21 – 25	26 – 30
Special professional	-// 24	25 – 31	32 – 35
Emotional and strong-willed	-// 39	40 – 48	49 – 55
Psychophysiological	-// 32	33 – 39	40 – 45
Physical	-// 27	28 – 35	36 – 40

Table 3: Determining the Rank of each Quality

No.	Name of quality groups	Average point self assess (exp.gr)	rank	Average point expert assessment	rank	Average point self assess (cont.gr)	rank	Average point expert assessment	rank
1.	Moral and ethical	4.25	9	3.85	9	4.20	9	3.80	9
2.	Social	4.50	7	3.60	7	4.45	8	3.73	7
3.	Professional and pedagogical	4.35	4	3.87	3	4.27	2	3.85	3
4.	Pedagogical	4.30	5	3.90	4	4.25	3	3.70	4
5.	All professional	4.55	3	4.05	2	4.50	4	4.05	2
6.	Special- professional	4.41	1	3.73	1	4.40	1	3.87	1
7.	Emotional-strong-willed	4.38	2	3.67	6	4.25	6	3.63	6
8.	Psychophysiological	4.25	6	3.65	5	4.27	5	3.73	5
9.	Physical	4.36	8	4.13	8	4.31	7	4.00	8

one of their types. Specific situation: You are a teacher of technology, and you need to define the level of interest features of pupils with special educational needs to the subject (independence in the performance of technological operations, ability to organize the workplace rationally, creative relation to work, high-quality production of work objects, etc.). For this purpose, it is necessary to find out by means of what methods it is possible to solve the set objective. Teachers most often use the empirical method of research. To them refer: observation, measurement, experiment, and comparison.

Observation is a purposeful and organized perception of the cognition object and fixing of information in the course of which the researcher receives actual material of his behavior and relations. The observation process isn't passive contemplation. It is the active, directed form of the gnoseological relation of the subject in relation to the object strengthened by additional resources of observation and its broadcasting.

Measurement is a reception in knowledge by means of which quantitative comparison of sizes of the same quality is carried out. Qualitative characteristics of the object are, as a rule, fixed by devices, quantitative specifics of the object are established by means of measurements.

Experiment is (from Latin *experimentum* – test, experience), method of knowledge by means of which in the controlled and operated conditions, the reality phenomena are investigated. Differing from observation in active operating by the studied object, the experiment is conducted on the basis of the theory

defining statement of tasks and interpretation of its results. The experiment allows: to study this or that phenomenon in "pure look"; to investigate the property of reality objects in extreme conditions; to conduct repeated experiments when studying this or that object. Comparison represents the method of comparison of objects and reality phenomena to detect similarity or difference between them. As a result of comparison that general that it is inherent in two or several objects is established, and identification of the general, repeating in the phenomena, as we know, is a step on the way to knowledge of the law. The known aphorism "everything is learned in comparison" is the best proof for that [13, 14].

Case E

Identification of level assessment indicators of research activity of pupils with special educational needs. Learning objective: development of methods of the organization of assessment of research activity of pupils. Specific situation: The teacher of technology for pupils with increased mental and creative abilities has to give the opportunity to carry out research activity. Such need is explained by the natural inquisitiveness of children and interest in understanding the world around. Involvement of pupils to research activity promotes the satisfaction of their individual requirements and inquiries, allows to develop mental and creative abilities, cogitative, and research abilities.

The main objective of organization of research training at technology lessons is to form pupils of readiness and ability independently, creatively, to master new ways of transforming raw materials and materials in the final product in any sphere of human

activity. In the course of the organization of the research activity of pupils, the teacher should follow the following rules:

1. To teach children with retarded mental development to work independently.
2. Avoid direct instructions, not to constrain the initiative of children.
3. Not to hurry with the removal of estimated judgments.
4. To teach children to defend their ideas and to refuse wrong points of view, to be tolerant.
5. To help children in the course of knowledge mastering:
6. Discussion results of completed work. Reflection.
7. Discussion of actions on situations:

What do I know about this problem?

What do I need to learn more? Where can I learn it?

- to ask people,
- to look in books,
- to look on the Internet,
- to observe and conduct experiments.

Task 1: To add the list of indicators on which it is possible to estimate research abilities of pupils (ability to ask questions, abilities to formulate initial concepts, abilities to analyze and generalize materials, abilities to compare, make conclusions, to transform thoughts to a graphic image, etc.).

Task 2: Consider Table 4, fulfill it with the indicators and make self-assessment of the research abilities on the 4-point system (0, 1, 2, 3) "The level indicators of assessment of research activity of pupils".

At this stage of the experiment for determining level and identification of dynamics of formation of research

Table 4: Criteria for Evaluation of the Research Work of the School Student with Special Educational Needs

No	Indicators	points			
		0	1	2	3
1	Level of independence of research work: - originality of the choice of the theme; - updating of the problem, - width of the context of the marked problem: - integration of the material studied.				
2	Level of mastering the material: - understanding of the author's plan and features of his embodiment; - knowledge and understanding of the work of art (chronotope, collisions, ideological and art originality, etc.); - use of the sociocultural context; - knowledge and pertinent use of criticism of various directions.				
3	Level of formation of research skills: - release of concrete material for carrying out the analysis; - possession of skills of interpretation of the text; - consistency of reasonable estimates and judgments; - work registration (table of contents, existence of the bibliography, etc.).				
4	Level of formation of the personal position: - identity of an interpretation of the theme of the work; - motivation of own relation to the material studied.				
5	Level of speech competence: - composition, logicity of the text; - compliance of style, genre, work language to its general plan; - observance for norms of literary language.				
Sum of points					

abilities of students with special educational needs during experimental work diagnostic tests by the same techniques were carried out, as at the stating experiment stage. Data of the control test have shown changes in comparison with measurements of the stating experiment by all criteria; however, these changes were only significant in an experimental group where there was a shift in a number of students with retarded mental development with average (61.2 %) and high (38.8 %) levels of formation of research abilities. In the control group, essential changes in the level of formation of these abilities didn't occur. As a result of usage of the case-method in the scientific-research activity of students were developed independent thinking, abilities to listen and consider the alternative point of view, with deep arguments to prove his/her position. By means of the case-method, students have the opportunity to show and improve analytical and estimated skills, to find the most rational solution of the problem put, study social interaction.

DISCUSSION

The case-method assumes constant interaction between the teacher and students, promotes positive motivation of their activity, the choice of the forms of behavior adequate to moral standards, and rules of interpersonal communication in the educational environment. The case-method is quite difficult multi-dimensional technology of training, representing a specific kind of analytical research technology, i.e., includes operations of the research process and analytical procedures [15]. This method serves as a way of collective training (work in a group and subgroups), includes mutual exchange of information between the student with special educational needs and teacher. The case method will allow students to get involved in studying the subject, contribute to the active assimilation of knowledge and skills in collecting, processing, and analysing information that describes various situations.

The case-method concentrates in itself considerable achievements of the technology "creation of success". It is characterized by students' activation, stimulating their success, emphasizing the achievements of participants in the educational process. The feeling of success is one of the main driving forces of the method, contributes to the formation of sustainable positive motivation and the buildup of cognitive activity [16]. The same case is not always suitable for working with students with retarded mental development in the

same parallel, but with a different level of mental activity. For this reason, for weak groups, the case has to be made simpler, for example, heuristic – analytical, and for strong groups, the case should become more difficult, from analytical to develop into a research one [17]. This study shows that as the most effective for students with mental retardation from weaker groups, authors offer a case representing a familiar everyday situation. If difficulties arise, the teacher can make the necessary changes as quickly and flexibly as possible, providing additional material. In correctional and developmental classes, several multilevel cases on the subject matter can be offered.

The use of the case-method in the management of students' research activities provides the latter with the assimilation of theoretical knowledge and the formation of practical skills in understanding and choosing general scientific and private scientific research methods in vocational training. According to V.A. Slastenin, with constructive, communicative, organizational, he singles out the research function of the pedagogical activity of the future teacher [18]. The ability to analyze, evaluate problem situations, and on this basis, make the right decision is an integral quality of a future specialist. B. Aydina, R. Ziatdinov, in their studies, addresses the issue of how students acquire self-control [19]. However, such methods must be as clear and detailed as possible, which also meets the requirements upon working with children with disabilities. Their main meaning is reduced to the knowledge of life and the acquisition of the ability for optimal activity, which, as mentioned earlier, solves the primary task of social adaptation of persons with disabilities in society.

The basic principle of any experiment is changing in each research procedure, only one of any factor at permanence and controllability of the others. Suppose it is required to check the influence of other factors. In that case, the following research procedure where this last factor change is carried out, and all other controlled factors remain invariable, etc. [20–25]. Presentation of the situation to students with retarded mental development can be given in different forms: electronic, verbal description of the situation, display of fragments from the movie, role playing by students with special educational needs. The main didactic material for the analysis of production situations is their verbal or electronic descriptions. Situations can be presented not only in the case form but also in the form of drawing,

plan, scheme, document with the mistakes in which identification consists in the analysis of the situation [26]. An important omission from previous work is the lack of development of case method principles in the context of special education. This study demonstrates that a case study is a fairly effective way to teach children with mental retardation. The essence of special education, as well as the essence of the case method, is to focus on the individual features of the student and develop their skills based on personal feelings and experience. In general, it should be noted that the implementation of the case method can significantly advance the system of inclusive education in Kazakhstan.

CONCLUSION

It is established that control of research abilities of students with special educational needs in the course of training in higher education institution will be successfully realized if to apply the case-method to develop research abilities that will give the chance to analyze, assess problem situations and on this basis to make the correct decision. Such management of pedagogical activity of students will be organized as a process of purposeful and conscious mastering research. Materials of this article can be useful to teachers of higher education institutions who are to educate children with mental retardation in the management of students' scientific-research activity by means of cases concerning new conditions of professional activity in the sphere of education. In the course of the research there were new questions and problems which need their decision. It is necessary to continue research on developing a technique of formation of students' research abilities and solutions to the problem of students training to research activity in the education system.

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