The use of the seminar as a facilitator in the process of teaching and learning computational languages

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ABSTRACT

In this work, an attempt is made to approach the use of the pedagogical practice "Seminar in the classroom", as a facilitator of the teaching-learning process in the Programming Logic discipline, of the Technical Course in Informatics at the Technical School of Praia Grande. The planning and structuring of the application of this pedagogical practice, along the lines in which it was developed, was based on the Guidance Notebook of the Pedagogical Training Course for Professional Education and was fostered by observing the repeated reports from students of different classes about their difficulty in learning the current three programming disciplines applied in the second module of the course

KEYWORDS: Seminars. Collaborative learning. Search. Education

O uso do seminário como facilitador no processo de ensino e aprendizagem de linguagens computacionais

RESUMO

Neste trabalho, procura-se realizar uma abordagem em relação ao uso da prática pedagógica "Seminário em sala de aula", como instrumento facilitador do processo ensino-aprendizagem na disciplina Lógica de Programação, do

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Curso Técnico em Informática da Escola Técnica de Praia Grande. O planejamento e a estruturação da aplicação desta prática pedagógica, nos moldes em que foi desenvolvida, basearam-se no Caderno de Orientações do Curso Formação Pedagógica para Educação Profissional e foi fomentado pela observância dos repetidos relatos advindos de alunos de turmas distintas sobre sua dificuldade de aprendizagem das atuais três disciplinas de programação aplicadas no segundo módulo do curso.

PALAVRAS-CHAVE: Seminários. Aprendizagem colaborativa. Pesquisa. Educação.

El uso del seminario como facilitador en el proceso de enseñanza y aprendizaje de lenguas computacionales

RESUMEN

En este trabajo se intenta acercar el uso de la práctica pedagógica "Seminario en el aula", como facilitador del proceso de enseñanza-aprendizaje en la disciplina Lógica de Programación, del Curso Técnico en Informática de la Escuela Técnica de Praia Grande. La planificación y estructuración de la aplicación de esta práctica pedagógica, en la línea en la que se desarrolló, se basó en el Cuaderno de Orientación del Curso de Formación Pedagógica para la Educación Profesional y se impulsó a partir de la observación de los repetidos informes de estudiantes de diferentes clases sobre su dificultad en aprender las tres disciplinas de programación actuales aplicadas en el segundo módulo del curso.

PALABRAS CLAVE: Seminarios. Aprendizaje colaborativo. Buscar. Educación.

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Introdução

The present paper aims to analyze the relevance of the seminar application in the quality of group work with focus on collaborative learning in 'Programming Logic', subject of the first module of the Informatics Technician course at Centro Paula Souza, responsible for introducing

students to the concepts, structures and technological bases congruent to computer programming languages..

According to Severino (1993) the objectives of the seminar are, among others, to deepen the reflections about a problem, to analyze in a more rigorous and radical way the text or theme, to make reading with the perspective of judgment and criticism, and to discuss the present explicit or implicit problem of the text.

According to Severino (2002), the didactic works required, above all, in the undergraduate courses, follow a universal character of logical structuring and methodological organization, that is, they are procedures that are still intrinsic part of the technical or scientific formation of the student. The works, since then, according to the author, will depend "mainly on their objectives and on the nature of the object addressed itself, as well as on the specific requirements of each area of human knowledge" (SEVERINO, 2002, p. 129)[4].

The development and presentation of the seminar is a study methodology that favors the perception of new ideas, new questions and perspectives, "the objective of the seminar is to lead all the participants to a deep reflection of a certain problem, from texts and in team" (SEVERINO, 2002, p. 63).[5]

For the use of the seminar to be productive, it is suggested that:

- Be applied as an essential didactic-pedagogical method for students;
- Study groups are divided and coordinated;;
- Receive guidance on work material;;
- Prepare research, didactic text and a script text to be presented to everyone in the room: teacher and listeners;
- Students are encouraged to participate and interact, including the final discussion;

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[4] "principalmente de seus objetivos e de natureza do próprio objeto abordado, assim como em função de exigências específicas de cada área do saber humano" (SEVERINO, 2002, p. 129).
[5] "o objetivo do seminário é levar todos os participantes a uma reflexão aprofundada de determinado problema, a partir de textos e em equipe" (SEVERINO, 2002, p. 63).

- Organize the necessary resources and techniques for presenting the work;
- Develop a seminar outline and organize content to be presented and time;
- In the presentation, demonstrate knowledge of the presentation theme;
- After the presentation is finished, time for reflection and discussion with the professor's mediation;
- Go beyond the material presented by the teacher, exploring different sources and references;
- Collective and elaborated understanding of the content of the theme presentation;
- Understanding the message from a critical perspective.

According to the Course Plan stipulated by Centro Paula Souza, this discipline is in charge of developing the following competencies: "Develop and interpret algorithms, flow chart and pseudocodes to code programs".

In these terms, the quality of choice and application of the didactic procedures aiming the good use of this discipline by the student body is fundamental, since this is a theoretical methodological basis strictly necessary for the understanding of the later disciplines of this course specifically focused on the development of computer systems.

In view of the above, aiming at bringing greater interaction between students and seeking to strengthen their understanding of the importance of their protagonism in the construction of their own knowledge, it was chosen as one of the didactic procedures, the application of the pedagogical practice of seminar in the classroom.

The protagonism of the student favors and enables the development of his autonomy, because he will feel motivated to seek knowledge independently, in this case the teacher will act as mediator of the teaching and learning process. The protagonism in the classroom contributes to dynamic classes, with stimulating the participation of the students, the

creativity in the students, stimulating the formation of a critical, inventive, creative, communicative and innovative individual.

> In order to reproduce and reproduce the social structure in which it is inserted, the school cannot limit itself to ensuring its reproduction. It has to produce innovations, it has to reproduce in innovation and reproduce innovations. Innovations that are piecemeal, segmented, rational, and controlled and whose introduction does not question the institutional context in which they are conceived, in short, innovations that are not innovative, that do not trigger an "uncontrolled" and "irrational" movement of innovation productions (CORREA, 1989, p. 14, our translation).[6]

Objectives

As a general objective, aspiring to dynamize the teaching-learning process of the specific content of the subject with the diversification of pedagogical procedures, it was carried out the choice of the pedagogical practice of seminar in the classroom, precisely because it is an unusual pedagogical practice in classes of algorithms and computational logic and by the understanding that the proper application of this practice would bring expressive results, adding useful and diversified knowledge to the students.

As specific objectives, the following are listed:

· The promotion of research in the design of training and developing protagonism in student learning;
· To enable students to reflect holistically on the contents and contexts of the technological bases studied during the semester, in order to show them that, at this point, they have already acquired the necessary knowledge and developed the ability to learn any other new computer programming language that is presented to them..

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[6] Para se reproduzir e reproduzir a estrutura social onde se insere, a escola não pode limitar-se a assegurar a sua reprodução. Ela tem de produzir inovações, tem de reproduzir na inovação e reproduzir inovações. Inovações que sejam parcelares, segmentares, racionais, e controladas e cuja introdução não questione o contexto institucional em que são concebidas, em suma, inovações que não sejam inovantes, que não desencadeiem um movimento "incontrolado" e "irracional" de produções de inovações (CORREA, 1989, p. 14).

- Allowing a first contact with the most common programming languages in the market, promoting more emotional security to the student who will have to study and learn, besides new computational paradigms contemplated in the Course Plan, three different programming languages along the second module;
- To have a positive impact on the reduction of school dropouts due to the above-mentioned elements.

Theoretical Referential

According to the article "Seminários de Pesquisa e Extensão da UEMG", made available at the portal of the University of the State of Minas Gerais, the research teaches the student to reason and to face new challenges and the seminars allow the free transit of the research with teaching and extension, because the research acts on the frontier of knowledge. Thus, it concludes that seminars are the best way to awaken the students to academic life, since the student-researcher, when preparing their presentation, is developing a series of skills that will be useful in professional life.

The mutual convergence between teacher and student as an exchange of knowledge and social participation in the learning space promotes an essential role in the professional formation of the student. Therefore, the teacher, as mediator, must be attentive in identifying information that will allow them to verify the learning of the student and, in parallel, provide ways to collaborate, promoting the return when necessary and even allowing the self-evaluation of the students, in the opportunity to lead them in the best possible way in the paths of knowledge.

> The seminar (whose etymology is linked to seed, sowing, new life, new ideas) is a very rich learning technique that allows the student to develop his or her capacity for research, production of knowledge, communication, organization and

grounding of ideas, preparation of research reports, collectively (MASETTO, 2010, p. 111, our translation).[7]

The use of seminar as an evaluative tool that enables the student to develop competences and abilities regarding research, freedom in the search for knowledge, expression and critical/reflexive positioning during the methodology of organization and result of the proposed task, contributing to the development of the discussion capacity, the interpretative exercise from different theoretical and practical perspectives, the promotion of group work and its contributions to the attainment of the perception of the other, situations that favor the good professional performance, today based on team work.

In order to have the assertive use of the seminar as a tool for teaching, the teacher needs to be able to apply the methodology. To Oliveira Costa, Ramos dos Santos, Lima Martins (2020), the continuous and effective formation of teachers is a possibility of reflection, updating, deepening of knowledge and practices, interaction with new knowledge, development of experiences and expansion of professional competences.

> [...] to think about teaching formation today is to pay attention to the fact that it must meet the challenges and needs posed. To do so, it is important that the teachers be trained so that they can articulate their knowledge through theoretical and practical reflection. Thought in this way, the teacher's formation refers to the reflection of the educational practice directed to the development of the autonomy of both the teacher and the student. (OLIVEIRA COSTA; RAMOS DOS SANTOS; LIMA MARTINS, 2020, p. 1194, our translation).[8]

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[7] O seminário (cuja etimologia está ligada a semente, sementeira, vida nova, ideias novas) é uma técnica riquíssima de aprendizagem que permite ao aluno desenvolver sua capacidade de pesquisa, de produção de conhecimento, de comunicação, de organização e fundamentação de ideias, de elaboração de relatório de pesquisa, de forma coletiva (MASETTO, 2010, p. 111).

[8] [...] pensar a formação docente na atualidade é atentar para o fato de que esta deve atender aos desafios e necessidades postos. Para tanto, torna-se importante que o professor seja formado de modo que possa articular seus conhecimentos mediante ação reflexão teórico-prática. Pensada desse modo, a formação docente remete-se à reflexão da prática educativa voltada ao desenvolvimento da autonomia tanto do professor quanto do aluno (OLIVEIRA COSTA; RAMOS DOS SANTOS; LIMA MARTINS, 2020, p. 1194).

The continuous formation of the teacher is an educational process, in which the teacher is the agent and subject of his practice, is responsible for construction and knowledge, through the stimulation of cognitive development of students.

> [...] this training should enable the teachers to work with knowledge in a way that transcends teaching and achieves scientific, pedagogical and didactic updating that allows them to create spaces for participation, discussion and reflection in their own professional activities. In this way, providing students with conditions to deal with the social realities in which they are inserted, being able to analyze them and act autonomously and consciously on them. Thus, teaching has a political content and, therefore, does not exist without learning, just as it is also cancelled without learning. (OLIVEIRA COSTA; RAMOS DOS SANTOS; LIMA MARTINS, 2020, p. 1196, our translation).[9]

For the authors, teachers are responsible for their task as researchers seeking information that accompanies historical, cultural and social changes, in order to provide teaching according to the needs of the students and required skills, highlighting the profile of learning problematizer, and mediator of knowledge for training, including professional, stimulating student autonomy.

With this dialogue, according to Freire's definition (1996):

> [...] in the conditions of true learning the students are becoming real subjects of the construction and reconstruction of the knowledge taught, alongside the educator, equally subject to the process. Only in this way can we really speak of knowledge taught, in which the object taught is apprehended in its reason for being and, therefore, learned by the learners (FREIRE, 1996, p. 13, our translation).[10]

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[9] [...] essa formação deve possibilitar ao docente trabalhar com o conhecimento de um modo que transcenda o ensino e que alcance uma atualização científica, pedagógica e didática que lhe permita criar espaços de participação, discussão e reflexão em suas próprias atividades profissionais. Desse modo, proporcionando aos alunos condições de lidar com as realidades sociais em que se encontram inseridos, sendo capazes de analisá-las e de agir de modo autônomo e consciente sobre elas. Sendo assim, o ensinar reveste-se de um teor político e, por conseguinte, inexistente sem o aprender, tal qual este também se anula sem aquele (OLIVEIRA COSTA; RAMOS DOS SANTOS; LIMA MARTINS, 2020, p. 1196).

[10] [...] nas condições de verdadeira aprendizagem os educandos vão se transformando em reais sujeitos da construção e da reconstrução do saber ensinado, ao lado do educador, igualmente sujeito do processo. Só assim podemos falar realmente de saber ensinado, em que o objeto ensinado é apreendido na sua razão de ser e, portanto, aprendido pelos educandos (FREIRE, 1996, p. 13).

The pedagogical relationship is based on dialogue, exchange, relationship and understanding between teacher and student, according to Freire (1996) primordial characteristics for the consolidation of an autonomous pedagogy that surpasses authoritarianism in the classroom, fostering a horizontality and approximation between teacher and student.

Methodology

In this study, the used methodology was a qualitative approach, based on bibliographic research. The theoretical and methodological bases of this project are based on action research. According to Minayo (1995, p. 22-23, our translation):

> The qualitative research answers very particular questions. It is concerned in the social sciences with the level of reality that cannot be quantified. That is, it works with the universe of meanings, motives, beliefs, values and attitudes, which corresponds to a deeper space of relationships, processes and phenomena that cannot be reduced to the operationalization of variable.[11]

According to Minayo (1995) qualitative research answers particular and social science questions, when reality that cannot be quantified thus works with significant universe, for example: aspirations, beliefs, values, human relations themes and phenomena that cannot be reduced to the operationalization of variables. The difference between qualitative research and quantitative research is of nature and the set of quantitative and qualitative data are not opposed, in fact they are complementary and interact dynamically. Qualitative research investigates the facts through observation and continuous or frequent contact with the group that researches.

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[11] A pesquisa qualitativa responde a questões muito particulares. Ela se preocupa nas ciências sociais, com o nível de realidade que não pode ser quantificado. Ou seja, ela trabalha com o universo de significados, motivos, crenças, valores e atitudes, o que corresponde a um espaço mais profundo das relações, dos processos e dos fenômenos que não podem ser reduzidos à operacionalização de variável (MINAYO, 1995, p. 22-23).

In this way the research has developed a work that reflects about the student's protagonism and how this innovative practice can change and contribute to the teacher-student in order to promote meaningful and enjoyable learning. Freire (1996) advocates that teaching must be based on a pedagogy of autonomy, and thus understand that education is intervention in the world, its practice is not neutral, is defined, intentional. For the author, a pedagogy of autonomy depends on experiences that stimulate decision making and responsibility, and dialogue, because through the dialogical relationship the subject relates to the world.

Freire (1996) proposes knowledge without which the educator will not have an educational-critical practice, describing them in detail and reflecting on the posture of the educators with their students, treating this two-way relationship, the practice of curiosity, as a disquiet of knowledge and as a basis of the dialogical posture, essential to build knowledge.

Based on these premises, the research brings that the execution of the work suggested to the students was carried out in groups, as well as its evaluation. The procedure as a whole, developed in the sense of demonstrating the relevance of the seminar as a pedagogical practice that increases the theoretical-conceptual deepening from the research.

From the beginning of the semester, the discipline of algorithms was handled with a support program called *VisuAlg*. According to the explicit definition on the website of the tool's developer, "*VisuAlg* is a program that edits, interprets and executes algorithms with a language close to Portuguese structured like a normal computer program". With this support tool, all the practical Technological Bases of the Course Plan described in the Teacher's Work Plan were worked on:

- Definition and creation of Variables and Constants;
- Arithmetic Operators and Arithmetic Expressions;
- Relational Operators;
- Logical Operators and Logical Expressions;

- Input, Processing and Output Commands;
- Pre-defined functions;
- Control Structures: Sequential; Conditional; Repetition;
- Vectors and matrices;
- Procedures and Functions.

Held as an activity for final mention composition, the pedagogical practice Seminar in the classroom, as an instrument to facilitate the teaching-learning process in the Logic of Programming discipline, besides the intrinsic bibliographic and documental research, was segmented in four main elements:

1. Presentation and explanation of the pedagogical practice to the students;
2. Development of the written work within the provided model;
3. Development of the presentation means, with slides or direct demonstration of application of the concepts in the Development Interfaces specific to each language (IDE);
4. Presentation in the classroom.

Presentation and explanation of pedagogical practice for students

The planning of this pedagogical practice began to be carried out soon after the first face-to-face meeting of the Special Program of Pedagogical Formation of Teachers for Professional Education. In the days following the meeting, the coordinator and the other teachers from the computer area of the school unit were consulted in order to idealize a project of real value to the students.

In the first class of the subject in June, already with the conception of the project concluded, the class 1IF3 (first night module of the technical course in computer science of the first semester of 2017) was asked to organize themselves in groups for the realization of this activity and they were informed that this work should be delivered and presented in the last day of class of the subject in the semester.

An explanation and demonstration was carried out step by step of how the written documentation should be carried out and how to meet the items requested as content of the seminar. For this example, *Visual Basic 6* was chosen, an old programming language (in computational terms), which has been in commercial disuse for some years due to the advent of more modern technologies, but which was perfectly suited to the proposal, also because of the simplicity of its syntax.

According to the *Microsoft* (2020) website is an object oriented programming language developed by *Microsoft* and released in 1991. When *Visual Basic* 1.0 was released, Bill Gates, president and CEO of *Microsoft*, described it as an ideal programming environment in that decade. On November 7th, 2005, a *Microsoft* released *Visual Studio* 2005, which included eight *Visual Basic* and the *.NET Framework* version 2. On February 27th, 2008, *Microsoft* released *Visual Studio* 2008, including *Visual Basic 9 .NET Framework version 3.5*. On April 12th, 2010, *Microsoft* released *Visual Studio* 2010 and the *Framework* version 4.

According to *Microsoft* (2020), the use of *Visual Basic* makes it fast and easy to create secure, released *.NET* applications is an integral part of the *Microsoft Visual Studio* package. Its latest version is part of the *Visual Studio* .NET package, focused on .Net applications. Its previous version was part of *Microsoft Visual Studio* 6.0, still widely used today by structured, imperative, declarative, object-oriented application, that is, Object Oriented Programming is a programming based on the concept of "objects", which can contain data in the form of fields, attributes, and codes, in the form of procedures, methods.

In the activity observed in the research, each group would need to research the origin and history of one of the proposed programming languages, showing examples of execution and syntax, making comparisons between what was learned and used during the semester in class, with the language researched at work. The languages listed for the execution of this work were *C#, JAVA, PHP, LUA e PHYTON* and each group was responsible for presenting one of them.

Written work development

The development of the written part of the work had as requirement, to fill a robust form, with tables of comparisons between the educational language and learned in class with the structures, syntax and operators of all languages listed for the work, within the model provided, contemplating the following items:

- How to make a comment;
- How to concatenate strings (or variable contents);
- Statement terminator (command line) / Structure separator;
- Declaration of Variables;
- Assigning values in Variables;
- Types of data;
- Mathematical Operators, Relational Operators, Logic Operators;
- Data input and output;
- Decision structures;
- Multiple Selection;
- Repeat structures;
- Vectors and matrices;
- Procedures and Functions.

Development of the presentation medium

The orientation of the work was passed through an expository lesson, with example of presentation and explanation of the report template, also sent by e-mail to the room representative. Each group was free to produce and conduct its own presentation, with a maximum time of 15 minutes.

Presentation in the classroom

From the beginning, the groups were warned that each student should concentrate on its own potential, contributing actively to a good teamwork,

which would be fundamental for obtaining a final result of professional quality. For the evaluation and attribution of mention to the work, global analyses would be carried out, focusing on the result and quality of the final work of each group.

Results and Discussion

Each group was responsible to a specific language for the presentations and the execution time (between four to five weeks) would be short so that each group could fulfill all the requirements of the work, researching one by one of the languages. Thus, even if not explicit, the collaborative behavior between groups and the exchange of information was expected and desired.

The result was extremely positive in this respect, since the class demonstrated an enormous capacity for teamwork, producing in a collaborative way everything that was requested: all groups presented the complete written part and within the requested standards.

As agreed with the students, the groups had total freedom to choose what their presentations would look like on the day of the seminar. With this, a variety of colors, formats and cadences were obtained, enriching even more the experience of knowledge exchange and capturing the attention of the rest of the class.

Considerations

Based on the results obtained with the application of this pedagogical practice, it is believed that the seminar as an appropriately oriented pedagogical procedure can provide a potential stimulator of research and critical debate in the learning process of the technical education student.

Regarding what is proposed in the objectives of this work, it is feasible the fulfillment of all expectations of the project, ratifying the viability and importance of the use of the seminar in the classroom as a pedagogical and evaluative practice for the subject of Program Logic,

reinforcing the understanding of the importance of the mediating role of the teacher, of the axiomatic necessity of the development of social interaction skills and team work, as well as the eminent educational value of the seminars and collaborative learning.

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