

Scientific Initiation Work at High School: Development of Research Skills in Dairy Producing Properties of Vale do Taquari / RS

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Abstract

The Scientific Initiation during the High School provides the development of scientific spirit and critical world view. The present work seeks to verify the skills developed through the work in Scientific Initiation of two high school students from a state school in the municipality of Lajeado/RS. In order to do so, the students were instructed to create and apply a script of semi-structured questions to 60 dairy farmers from Vale do Taquari, participants of the research group “Sustainability in Milk Producing Properties”, conducted through interviews. Afterwards, the data were tabulated and analyzed by the students, allowing conclusions and presentation of the results, also evaluating students performances. These data were presented at a congress. It was concluded that the students developed skills in communication, data interpretation, autonomy and resourcefulness in the search for scientific materials.

Key-words: BIC Jr., Research Education, Scientific Initiation.

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Trabalho de Iniciação Científica no Ensino Médio: Desenvolvimento de Habilidades de Pesquisa em Propriedades Produtoras de Leite

Resumo

A Iniciação Científica de Ensino Médio (BIC EM) proporciona o desenvolvimento de um espírito científico e visão de mundo mais crítica. O presente trabalho busca verificar as habilidades desenvolvidas por meio do trabalho de BIC EM de dois alunos do Ensino Médio de uma escola estadual do município de Lajeado/RS. Para tanto, propôs-se aos alunos a criação e aplicação de um roteiro de perguntas semiestruturadas a 60 produtores de leite do Vale do Taquari, participantes do grupo de pesquisa “Sustentabilidade em Propriedades Produtoras de Leite”, realizado por meio de entrevistas. Após, os dados foram tabulados e analisados pelos BIC, possibilitando conclusões e apresentação dos resultados, também avaliando o desempenho dos estudantes. Estes dados foram apresentados em congresso. Concluiu-se que os bolsistas desenvolveram habilidades na comunicação, interpretação de dados, na autonomia e desenvoltura na procura de materiais científicos.

Palavras-chave: BIC Jr., Educação pela Pesquisa, Iniciação Científica

Trabajo de Iniciación Científica en la Enseñanza Media: Desarrollo de Habilidades de Investigación en Propiedades Productoras de Leche del Vale do Taquari/RS

Resumen

La Iniciación Científica de Enseñanza Media proporciona el desarrollo de un espíritu científico y una visión de mundo más crítica. El presente trabajo busca verificar las habilidades desarrolladas a través del trabajo de Iniciación Científica de dos alumnos de la Enseñanza Media de una escuela estatal del municipio de Lajeado / RS. Para ello, se propuso a los alumnos la creación y aplicación de un itinerario de preguntas semiestruturadas a 60 productores de leche del Valle del Taquari, participantes del grupo de investigación “Sustentabilidad en Propiedades Productoras de Leche”, realizado por medio de entrevistas. Después, los datos fueron tabulados y analizados por los estudiantes, posibilitando conclusiones y presentación de los resultados, también evaluando el desempeño de los estudiantes. Estos datos se presentaron en un congreso. Se concluyó que los alumnos desarrollaron habilidades en la comunicación, interpretación de datos, en la autonomía y desenvoltura en la búsqueda de materiales científicos.

Palabras clave: BIC Jr., Educación por la investigación, Iniciación Científica.



Introduction

The world scenario is constantly changing, be it technological or social, boosting the need for updating and adaptation of all. In this context, according to Demo (2011), it is important that some changes also arise in the school, whose environment is conducive to the emergence of the challenge of science, leaving aside the reproductive method, in which the student is often not instigated to conduct autonomously. In this way, education requires constant implementation of relevant and innovative educational proposals, following the changes that occur year after year. For Halmenschlager, Stuaní and Souza (2011), it is necessary that the educational practice is adequate to the critical reflection and collective work, giving the student a greater understanding of society.

Considering that education also involves a social dimension and is of great importance to all, it is seen that education itself is a broad field based essentially on research and action, which are relevant factors for students to obtain knowledge and to update themselves with crucial issues (CRUSOÉ; MOREIRA, 2017). Nowadays, students have to acquire knowledge in a more systematized way, and through this, to generate a world-view of all those that are instructed in the school field (NASCIMENTO; CAVALCANTE, 2018). Still, in addition to these statements, Moreira and Silva Jr. (2016) deal with the need for the student, considering the uncertain conditions, to elaborate several other possibilities of being, acting and become a citizen.

By providing development in the education field, also socially and economically, studies about the subject are very important and prominent in the academic field. The studies about generation of knowledge by means of the research also provide a greater awareness of educational issues within society, although the production of research with a quantitative approach in the area is insufficient (NASCIMENTO; CAVALCANTE, 2018).

According to Orrú (2018) several studies, both in Brazil and in many other countries, show that it is important that the student is the protagonist of his education, through an autonomous and contextualized learning. For this, it is believed that the student needs several opportunities for different ways of studying and, to be possible, the school needs to expand its opportunities, providing students with greater access to science, new knowledge and instigating students to seek wisdom and deepen their practices. The student needs to be seen under different dimensions, as an independent being and with the capacity to obtain new knowledge with autonomy, which can undoubtedly be acquired in school (MOREIRA; SILVA JR., 2016).

There are several methodologies for the search for autonomy in obtaining knowledge and also in academic growth, one of which is scientific initiation. Thus, research, which was reserved only at the highest levels of academic training, can find a fruitful field if started in Basic Education, as suggested by Demo (2012a), proportioning that students learn beyond what is exposed in class. According to Demo (2011), the teacher must be able to guide the students in a research process, motivating them to seek knowledge and, from this, make their own elaborations, productions that reflect a change in the concept of “good student”, that was associated with ease of memorization and good grades, to focus on the critical, intelligent thinker (DEMO, 2012b).



Demo (2012a) believes that the presence of research from school provides the student with the ability to learn to argue with autonomy, questioning, doubting, making him the author of their proposals, allowing the construction of their citizenship based on science. In addition, according to Demo (2011), the research awakens in the student the curiosity in discovery and creation, the restlessness, instigating the construction of a being with a critical and questioning conscience.

As said by Demo (2012a), although the research is relevant to the student since the school period, it is usually only in the university that the research and scientific knowledge are produced, in other words, it holds and can manipulate theories and reflections on diverse subjects often not approached in the school. Crusoé and Moreira (2017) complement this idea by stating that if scientific production is restricted to the university, it is as if there are two parallel and independent worlds that do not collaborate with the exchange of knowledge between both sides, the scholar and the academic. In this context, it is also applied the fact that university researchers often maintain a hierarchical superior position, refusing to share academic knowledge with school teachers, maintaining a hierarchical construction in the generation of knowledge (CRUSOÉ; MOREIRA, 2017).

Still in this context, Crusoé and Moreira (2017) comment that the inequalities between the two classes, school and university, are results of how Brazilian society is currently structured. In spite of this fact, the authors explain the importance of the dynamics of approach between the school and university. According to Orrú (2018), there are several innovative possibilities to develop this scientific knowledge also in students of Basic Education, with autonomy and through their curiosity to broaden the common learning context and the experiences lived by them, in addition to what is taught at the school.

Among the possibilities of approximation of the university and school field, there is the Scientific Initiation still in High School, which aims the formation of the student's citizenship. The Junior Scientific Initiation Scholarship Program (PIBIC Jr.) of the National Council for Scientific and Technological Development (CNPq) seeks to positively influence the student academic career, providing access and an active role of the student in the academic environment, encouraging the scientific spirit and fostering the development of a new world view, increasing interest in activities pertinent to the projects in which they are inserted (MORAES et al., 2013). Demo (2012a) states that Scientific Initiation, if present throughout the academic life of the student, is a promising tool for advancement, since it exercises autonomy in the search for arguments and is also a factor of great renewal in the teaching profession.

The program PIBIC Jr. is aligned with these premises, aiming to awaken the scientific vocation in elementary and high school students, encouraging the search for knowledge and participation in scientific or technological research activities, guided by qualified researchers, in Higher Education Institutions or research centers (CNPq, 2006). In addition, the Jr. Scientific Initiation, according to Paulino (2009), seeks to develop capabilities, competencies, skills and critical sense of each participant in a project, to be able to evaluate and participate in decisions in the environment experienced.

In practice, it is possible to note that the program is successful through studies in the field, which show the effectiveness of the project and its importance recognized by the



students themselves, especially when deciding their professional future (MACIEL et al., 2016). In a survey of high school students who did not participate in the project, it was shown that the minority revealed their family's influence on their professional choice when questioned about it, which makes it evident that this is not a common fact today, in view of changes in society (PAMPONET et al., 2009).

In another research carried out with students who worked at PIBIC Jr., it is shown that they follow the academic career in the same area as the research that they participated, highlighting the influence of the project on academic decisions, areas of interest for acting and professional improvement through postgraduate studies. With this, it is evident that the student will have a differential within the academic environment (MORAES, 2013). In addition, a study by Maciel et al. (2016) shows that scientific initiation becomes important for the student's life, especially in the sense of obtaining new experiences and knowledge, since it creates an independence in the search for scientific materials and manages to interpret and withdraw information and knowledge from them.

Through this bias, it is noted that the experiences and perceptions that these students have within a research group, through scientific initiation, contribute to the development of skills that will later assist them in the professional future. Among the skills are, for example, autonomy, independence, interpretation, communication, writing, ability to relate subjects, among others. Therefore, the present research seeks to verify the abilities developed through the work of BIC EM (Scientific Initiation Grant - High School), of two high school students from a state school in the municipality of Lajeado / RS included in the Institutional Scholarship Program Scientific Initiation for High School (PIBIC-EM).

The work was developed at the Universidade do Vale do Taquari - Univates, from August 2016 to July 2017, in the research project entitled "Sustainability in Dairy Producing Properties". For this, the work of interviews in the rural properties was emphasized, evaluating the students' resourcefulness during the work, the evolutions that they obtained and the reflection of that in the academic, personal and social life of the scholars. The aim of this study is to analyze the influence of PIBIC-EM in the participants' development.

Materials and Methods

The research on how to approach the problem, is classified as qualitative. As regards its objectives, it is exploratory and descriptive and uses as a technical procedure a case study, with a description of the activities carried out by the students, interviews with them and their professors, as well as an analysis of the application of the questionnaires prepared by the scholars. The form of data collection is longitudinal, and the activities of the BIC-EM students during the year of engagement with the research were monitored.

The BIC-EM students were encouraged to develop some skills and competences, mainly the observation in the field and the quest for autonomy in the search and for scientific articles and reading for a learning also about the academic language. The research activities included both readings and field tasks, to be possible also an explanation of methodologies that allowed the student a vision of the importance of practical



activities. For the development of the autonomy in the search for reliable references, as well as the familiarization with the subject worked, was requested researches addressing subjects pertinent to agriculture, highlighting important points to be discussed in the research, such as dairy cattle feeding as well as their quality of life, monitoring of milk produced and techniques used in milking and storage of milk in the rural property.

Some of the activities developed by the students were aid in the field collections (of water, soil, milk and plants), identification of collected materials (plants) based on adequate bibliography (IMAGE 1), as well as laboratory analyzes of soil and milk (IMAGE 2 and 3). The students carried out bibliographic research and preparation of reports and articles in scientific format, participated in a scientific event and courses in the areas pertinent to the project, including an English course at the University, offered in the project “Projeto I”.

Image 1 – Student 1 identifying plants of the visited properties



Source: Collection of the research group (2017)

Image 2 – Student 2 analyzing the milk collected in the visited properties



Source: Collection of the research group (2017)

Image 3 – Student 1 collecting soil (the left) and analyzing it in the laboratory (on the right)



Source: Collection of the research group (2017)

From the knowledge acquired through field tasks and bibliographical research, the scholars, with the help of researchers, prepared a script of 22 semi-structured questions - subjective and objective - and interviewed the farmers participating in the research project (IMAGE 4), with subsequent tabulation, analysis and presentation of the data. The students visited 60 dairy properties, among the 124 participants of the project, distributed in 36 municipalities in the Vale do Taquari-RS region, with activities occurring from January to June 2017.

Image 4 – Student 2 interviewing a rural producer participant of the project



Source: Collection of the research group (2017)



The interviews covered four dimensions:

- a) producer and family schooling;
- b) the life quality of the cattle under the aspect of the feeding used in the herd, quantity of milk produced per day, water availability and diseases and their periodicities;
- c) monitoring of milk quality;
- d) technologies used in milking, storage and collection of milk produced. Subsequently, a table was produced for better analysis, crossing and discussion of the data.

The research results were presented by the students themselves, orally, in the form of slides, in an event held by Univates, the “I Congresso Internacional de Ciência, Tecnologia e Conhecimento”.

To evaluate the development of the competences proposed in the Scientific Initiation Grant, some aspects were considered: resourcefulness, assertiveness, autonomy, initiative, domain of the subject worked, capacity of analysis, understanding of data and expression of results. In addition to these aspects, it was analyzed the awakening of the critical sense, which makes the student able to formulate hypotheses and propose appropriate suggestions. For this question, the researcher who accompanied the work was interviewed in the student’ presentations at the event.

In addition, a self-assessment of each scholar was requested in relation to their abilities, where each student pointed out if there was a progress in acquiring knowledge about the studied topics, describing the points in which they believed there had been improvements and the main barriers encountered at the time of the activities proposed by the researchers.

In relation to the impact on students’ academic life, it was verified, in the school where the students attend, the perception of academic coordination about changes in posture and school performance, as well the questioning about possible manifestations of the parents or guardians regarding the observed changes in the children behavior.

Results And Discussion

During the 12 months that the activities were developed in the proposed project, the students carried out the tasks in an interested way, fulfilling stipulated deadlines and always based on reliable literature and methodologies. As for the initiative, it was noted that, at the beginning of the work period, the students needed to be requested to participate in the project, and during the progress of the activities, they became more proactive and seeking autonomy regarding the search for materials and making spreadsheets and tables. The image 5 shows a table prepared by the students in text where they were challenged to discuss the data based on the bibliography consulted.

Image 5 – Table with data collected, by the students, in the interviews and later discussion

Alimentação	f	fr(%)
Pastagem	44	73,3
Silagem	40	66,7
Raçãoi	37	61,7
Milho	20	33,3
Outros ⁽¹⁾	4	6,7
Complementos ⁽²⁾	4	6,7

(1) Feno, cana-de-açúcar, levedura e refinazil

(2) Sais minerais, bicarbonato de sódio e gordura protegida.

Source: Research data (2017)

After the reading, students demonstrated mastery of the subjects related to their activities, being able to - after the application of the questionnaires - analyze and understand the obtained data and, in addition, express the results and interpret them, discussing possible hypotheses and arguing clearly and demonstrating a certain mastery of the subject.

From the data obtained by the interviews, the students outlined the profile of the producers regarding the previously defined aspects, allowing them to draw conclusions about, for example, the influence of rural producers' schooling on the management of their property and with that, it was verified that the scholars understood and knew, in an effective way, to create hypotheses about the results obtained in the questionnaires. The students realized the importance of the study also for rural producers, since they refer that the study is necessary for better understanding of the practices adopted as ideals by the legislation and also the reasons why certain decisions have to be made. The study makes farmers invest in promising areas in agriculture, leading to higher financial returns and farm resources being better utilized, with awareness leading to more sustainable production.

Still in this bias, the students also realized the importance of preserving native areas for the ecosystem and also to keep the biodiversity present in the environment. These facts were noticed from visits to the properties where they could be in contact with these areas of preservation and to realize that, often, they were not in agreement with the legislation, possessing improvements or even animals, arranged by the owners, using resources available in these areas.

At the time of data tabulation, students have proved themselves adept at manipulating spreadsheets and tables for an efficient visualization of the data obtained. Besides that, there were positive skills in the analysis and interpretation of results, making possible discussions of the studied topics, and the readings made in scientific materials. In addition, they understood that it is necessary, before any research is done, to perform a good reading in reliable materials in order to have a good orientation in methodologies, besides acquiring a scientific language for the later writing of articles and presentations.

The students found that the differentiated feeding for the animals in their first lactations, since these have high nutritional needs, results in a healthier growth of the herd and with that, the dairy productivity is more successful. In addition, the students realized that many producers, despite not having a complete high school, have an empirical knowledge passed on by previous generations that worked in agriculture, as well as from

personal experiences with the time that they have been working in the farm. It was also noticed the conservatism of the rural producers, who often kept the knowledge obtained through other generations and with that, ended up not having control of the profits and costs generated in the property. In this way, the students realized the importance of financial management for the development and growth of the enterprise.

The students were very interested in carrying out the activities proposed by the researchers, as well as being impacted by the possibility of creating knowledge, they also believe that the studied and worked themes help not only in the project, but also in their day-to-day lives. Still, one of the students said that his personal and academic growth was notorious. The main challenges faced by both students at the beginning of the research period were scientific writing; but also reported that, with the help of the others participants in the project and researchers, this difficulty was overcome and they became used to the academic and scientific universe.

Another activity that became a challenge for the scholars was public speaking, since they participated in an event in which they had to make presentations regarding the results of researches. This difficulty was overcome with the help of the group and researchers of the project, who provided internal presentations and, in some way, promoted disinhibition. According to the researcher, who attended the presentation of students at the event:

I considered that the presentations were excellent for high school students: the slides were very well designed, clear, objective, with images and excellent structure. He proved to be sure, calm, seeming to have participated in all the stages of the research he presented, [...] knew how to answer the questions of the evaluators (RESEARCHER 1, 2018).

According to scholars' reports on their self-assessments, the Junior Scientific Initiation program was of great benefit, which can be demonstrated by the speech of one of the students:

I believe that as the main result I can say that it was the loss of fear of public speaking. [...] I expanded knowledge in new areas, acquired correct posture in presentations [...], possible application of the knowledge in my daily life (STUDENT 1, 2018).

The other scholarship holder states that "The Scientific Initiation grant provided a wide experience in the scientific and research universe, thus contributing to the learning of the students and consequently broadening their areas of knowledge" (STUDENT 2, 2018). Still, referring to the activities carried out in the research, the student 2 states that "Field experiences have approached the realities experienced by rural producers, knowing and witnessing themes that are often seen only in theory." For this scholar, participation in the research project, as a high school student, was fundamental to the choice of the undergraduate course, Biological Sciences, once it started in the second semestre of 2017. This research corroborate with a study of Moraes (2013) when the author affirms that participation in scientific initiation still in High School influences the profession choice.

Both students affirm that the experience and contact with the academic world lived in the period of BIC EM, can help in choosing the course that later will do in the university or in the profession that will follow in the future, since the Scholarship of Scientific Initiation promotes a contact of the scholars with various topics and having contact with researchers and students from different professional areas, causing them to create or discover affinity for a particular subject or specific area.

Regarding the perception of the school and the school community, it was verified that the scholars have a good performance and are also interested in the school activities, obtaining satisfactory concepts and notes for the approval in the disciplines and content presented. The school coordination reported that the students were leaders in their classes, talking enthusiastically about their activities and that in the communicational aspect was noticeable the change after the period in which they remained in the scientific initiation.

A research carried out by Welter (2016) in Florianópolis / SC shows that when the young students had contact with the university, they felt impacted and empowered, mainly because they had the opportunity to be in scientific initiation and to contribute in some way to the production of knowledge. In addition to impacting students, the university itself was also positively affected by the presence of high school students, because of the knowledge generated in the interaction of these students in contact with professors and university students.

In another study with high school scholarship students from the city of Chapecó / SC, students were encouraged to organize and participate in scientific events, classes, courses and trips and were also encouraged to carry out bibliographic research to elaborate and present scientific projects and articles (WELTER, 2016).

Both projects in the study of Welter (2016) provided students with contact with scientific content, methodologies, activities and especially the important contact and approach with researchers and university students. With this, both the students of basic education and the institutions participating in the projects were positively impacted by the opportunity to share knowledge and carry out a wide variety of activities.

The data of the present study also corroborate with the conclusion of Maciel et al. (2016) that BIC Jr. participants in the PICMEL / FAPERGS project demonstrated their ability to study in depth, communicate with farmers and in the scientific community, and also developed autonomy, demonstrated in initiatives taken by students during the research.

In practice, it is possible to note that the program is successful through studies in the area, which show the effectiveness of the project and its importance recognized by the students themselves, especially when deciding their professional future, which is in line with the speech of Maciel et al. (2016).

With this, it is evident that the student will have a differential within the academic environment, as Moraes (2013) concludes. In addition, the study by Maciel et al. (2016) shows that the scientific initiation becomes important for the life of the student, mainly in the scope of obtaining new experiences and knowledge, to create an independence in the search for scientific materials, being able to extract and interpret information and knowledge of these documents.



Conclusion

It was concluded with the research performed, that the Scientific Initiation in High School has a very important role in the students' life. It was observed that they developed communication skills, both in smaller groups and with the public, in the collection and interpretation of data and in the autonomy in the search for articles and other scientific materials. In addition, students developed the ability to relate subjects and interpretation of articles and materials studied, since they had to present data in scientific events.

The opportunity provided the students with greater security for the approach of interviewed, public communication, in addition to making them develop independence in the preparation of the materials to be presented and was also important for the professional choice, to enter higher education.

References

- CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico). **Anexo V: Iniciação Científica Júnior - ICJ - Norma Específica da Resolução Normativa 017/2006: Bolsas por Quota no País.** 2006.
- CRUSOÉ, N. M. C.; MOREIRA, N. R. Aproximação entre o campo acadêmico e o campo escolar: um diálogo possível. **Revista Tempos e Espaços em Educação**, São Cristóvão, v. 10, n. 23, p. 223-234, 2017.
- DEMO, P. Iniciação Científica: razões formativas. In: MORAES, R.; LIMA, V. M. R. (Orgs.). **Pesquisa em sala de aula: tendências para a educação em novos tempos.** 3 ed. Porto Alegre: EDIPUCRS, p. 77-92, 2012a.
- DEMO, P. **Pesquisa e construção de conhecimento: metodologia científica no caminho de Habermas.** 7 ed. Rio de Janeiro: Tempo Brasileiro, 2012b.
- DEMO, P. **Pesquisa: princípio científico e educativo.** 14 ed. São Paulo: Cortez, 2011.
- HALMENSCHLAGER, K. R.; STUANI, G. M.; SOUZA, C. A. Formação Docente no Contexto Escolar: contribuições da reconstrução curricular via Abordagem Temática. **ALEXANDRIA Revista de Educação em Ciência e Tecnologia**, Florianópolis, v.4, n.2, p.83-107, 2011.
- MACIEL, M. J.; REMPEL, C.; PETRY, F. H.; SALVINI, J.; PESSI, D. Potencialidade do trabalho de Iniciação Científica Júnior do programa PICMEL/FAPERGS/CAPES no trabalho com plantas medicinais. **Destaques Acadêmicos**, Lajeado, v. 8, n. 3, p 116-128, 2016.
- MORAES, G. C.; SOPPA, L. P.; UMBELINO, G. K.; VIEIRA, C. H. A iniciação científica Júnior - o que dizem os alunos. In: XI Congresso Nacional de Educação – EDUCERE, II Seminário Internacional de Representações Sociais, Subjetividade e Educação – SIRSSE e IV Seminário Internacional sobre Profissionalização Docente – SIPD/Cátedra UNESCO, 2013, Curitiba. **Anais...** XI Congresso Nacional de Educação – EDUCERE, II Seminário Internacional de Representações Sociais, Subjetividade e Educação – SIRSSE e IV Seminário Internacional sobre Profissionalização Docente – SIPD/Cátedra UNESCO, 2013.
- MOREIRA, A. F.; SILVA JR, P. M. Currículo, Transgressão e Diálogo: quando outras Possibilidades se Tornam Necessárias. **Revista Tempos e Espaços em Educação**, São Cristóvão, v. 9, n. 18, p. 45-54, 2016.
- NASCIMENTO, L. F.; CAVALCANTE, M. M. D. Abordagem quantitativa na pesquisa em educação: investigações no cotidiano escolar. **Revista Tempos e Espaços em Educação**, São Cristóvão, v. 11, n. 25, p. 251-262, 2018.
- ORRÚ, S. E. Base Nacional Comum Curricular: à Contramão dos Espaços de aprendizagem inovadores e inclusivos. **Revista Tempos e Espaços em Educação**, São Cristóvão, v. 11, n. 25, p. 141-154, 2018.

PAMPONET, B.; LIRA-AS-SILVA, J. R.; MISE, Y. F.; LIRA-DA-SILVA, R. M. A importância da iniciação científica para a escolha profissional. In: VII Encontro Nacional de Pesquisa em Educação em Ciências – Enpec, 2009, Florianópolis. **Anais...** VII Encontro Nacional de Pesquisa em Educação em Ciências – Enpec, 2009.

PAULINO, A. G. Compromisso social da Universidade: o Programa de Iniciação Científica Júnior na UFLA. In: CONGRESSO DE EXTENSÃO DA UFLA E I FÓRUM REGIONAL DE EXTENSÃO, 4, 2009, Lavras. **Anais...** Congresso de Extensão da UFLA e I Fórum Regional de Extensão, 4, 2009.

WELTER, T. Sobre Desafios da Formação de Estudantes e Profissionais da Educação Básica em Santa Catarina, Brasil. **Revista Tempos e Espaços em Educação**, São Cristóvão, v. 9, n. 19, p. 181-192, 2016.

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