

# I used to think about assessment of learning... But now I know...: Perceptions revealed by undergraduates in biological sciences<sup>1</sup>

## ABSTRACT

When considering the initial education of teachers of Biological Sciences regarding their knowledge about the assessment of learning, this research, of qualitative approach and interpretative nature, aimed to analyze the perceptions of undergraduates of Biological Sciences from a public institution in Paraná related to the theoretical and practical foundations of learning assessment, after having attended a training course developed by the authors on learning assessment. The data analysis, collected through online questionnaires, was performed by means of Textual Discourse Analysis (TDA), and showed that, after attending the course, the undergraduates revealed some principles and concepts of learning assessment, such as formative and summative assessments and their importance, criteria, feedback, instruments, and showed some understanding of assessment as a way of monitoring teaching and learning processes. The perceptions of the undergraduates revealed a formative conception of assessment as well as the need for deepening the theoretical and practical foundations of learning assessment in the initial education of Biological Sciences teachers.

**KEYWORDS:** Assessment of/for learning. Teacher's initial education. Biological Sciences.

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## INTRODUCTION

Currently, based on cognitivism, constructivism, and socio-constructivism, the learning process is considered an active process, in which meaning is built up, and that the understanding of new concepts depends on pre-existing knowledge.

Learning is socially built, therefore, whatever is learnt is socially and culturally predetermined. In such perspective, assessing students' performance through specific activities which require memorization of content, but are decontextualized and detached from teaching and learning processes becomes an insufficient evaluation instrument.

Assessment must cover complex learning processes and it should help and motivate students to solve real problems faced in everyday life, and be exposed to different assessment instruments containing varied and open tasks conducting them to meaningful learning (FERNANDES, 2009).

In addition, social, cultural, and economic changes in contemporary society demand diverse skills from young people, leading them to adopt a critical posture to meet such demands. Moreover, they also require governmental action promoting curriculum alteration, diversification and flexibilization of educational and formative resources, promotion of qualification and education throughout life, extending mandatory schooling, giving more autonomy to schools, and developing State regulation mechanisms regarding the curriculum and evaluation procedures (FERNANDES, 2009).

Currently, curricula are much more demanding than in the past decades, thus they require more than simple memorization and reproduction of content. For this reason, when thinking the current learning challenges and requirements, studies on learning assessment have been carried out aiming at implementing curricula that help to improve the education system and align assessment to the new curriculum requirements. The desirable scenery provides critical teaching, which prepares students to live and act in society, in other words, a curriculum that provides assessment with challenging tasks for the students is concerned with learning, as well as continuous and integrated to the teaching and learning processes, and one that allows students to take part in the process (FERNANDES, 2009).

In such perspective, in which the intention is to improve the education system to make it more democratic, assessment practices must be rethought since assessment has great influence in the education process. This occurs because the type of assessment used might motivate or demotivate students, help them overcome obstacles or become one of them, it can be inclusive or excluding, depending on the way it is organized. Learning assessment is an essential component in the democratization of education systems (FERNANDES, 2009).

For the learning assessment to play this role and develop in the way described above, it is necessary to have high quality teachers' education. However, regarding their initial education, in general, Villas Boas (2017) reported that several studies demonstrated (MENDES, 2006; ANDRE *et al.*, 2012; VEIGA *et al.*, 2012; GATTI, 2014; SOARES, 2014) that the education of future teachers has been seen rather poor regarding learning assessment.

When reflecting upon the importance of assessment, Villas Boas (2017) evidenced that its inclusion in the curriculum of teaching courses in teachers' initial education might contribute to the future professionals' practice and to the organization of the pedagogical work in basic education schools, increasing their commitment to their students' learning. That author emphasized that it is crucial to qualify teachers to teach, interact and evaluate, thus teaching courses must provide those students with the necessary tools to work in basic education, by developing teaching practices that are committed to guiding students' learning and, consequently, to the evaluation of such learning.

Regarding Biological Sciences specifically, some research has evidenced the scarcity of studies on learning assessment in teachers' initial education (TEIXEIRA, 2008; VILLAS BOAS, 2017; FERREIRA, 2022). Those studies demonstrated that students have a superficial introduction to learning assessment, which leads them to reproduce the assessment practices they experienced in their school life since basic education.

For this reason, the need to develop a specific course approaching theoretical and practical aspects of learning assessment was evidenced. During their participation in such course, students were asked to complete the following statement: "I used to think about assessment of learning..., but now I know..."

This article originated from the answers given to this task, which was part of a qualitative and interpretive study at the master's level, aiming to analyze the perceptions of Biological Sciences students from a public institution in the state of Paraná regarding the theoretical-practical fundamentals of learning assessment after attending an assessment qualification course.

This text presents partial results of the research carried out with the Biological Sciences students and is organized into three sections in addition to this introduction and the final considerations. The first section provides the fundamentals of learning assessment, while the study methodology is presented in the second section. Finally, the third section presents the result analysis.

## **LEARNING ASSESSMENT: BRIEF FUNDAMENTS**

The learning assessment perspective guiding the discussions in this study is based on the studies put forward by Fernandes (2009, 2019, 2020a, 2020b). For that author, learning assessment is a continuous process, integrated to teaching and learning processes, collection of information about what students know and/or are able to achieve, in several activities developed throughout the school period. It must focus on students' development and teachers' work.

Fernandes (2019), as well as Santos (2019), Borralho *et al.* (2019), and Lopes and Silva (2020), considered that formative and summative evaluations are integrated processes, which, when used complementing each other, enable significant contributions to the improvement of teaching, assessment, and learning processes. By differentiating the terms assessment of learning and assessment for learning, those authors revealed that assessment of learning is linked to a summative conception of evaluation, whose purpose is to verify at the end of certain period whether the students learned or not what they were taught in that period, and whose results can be used with the purpose of promoting

classifications or not. It is the type of assessment that is mostly focused on the teacher. Regarding the assessment for learning, it entails a formative conception of assessment, which privileges students' development throughout the whole learning process, aiming at giving quality feedback, and in which the students are also protagonists of the teaching and learning processes.

When defining these terms, Fernandes (2009) defended that the assessment of learning and the assessment for learning must be developed as complementary to each other in the routine of the classroom. For this reason, he used the expression assessment of/for learning or assessment of learnings since he considers that assessing is a complex process, in which teaching, evaluation, and learning processes are not separated. Conversely, in his analysis, those processes must occur in an integrated form since their function is to improve different types of learning by monitoring students' development.

Fernandes (2009) pointed out the need for the development of formative assessment in the classroom routine since the literature in the area has advanced significantly, but the predominant practices observed are still those of traditional assessment, of a classificatory character. A rupture is necessary with those practices that consider assessment only as a single instrument, in general the test, which is applied at the end of a period to assign marks to students.

Adopting a formative perspective of assessment implies some theoretical-practical fundamentals that must be understood, such as the concepts of criteria, rubrics, feedback, instruments, or techniques, etc. Therefore, it is necessary to understand that assessment is "eminently a pedagogical process, fully integrated to teaching and learning, intentional and interactive, whose main function is to regulate and improve students' learnings" (FERNANDES, 2009, p. 59).

The definition of criteria and the description of performance levels is fundamental in formative assessment since they inform students about the learning objectives of each teaching and assessment task. Therefore, "criteria define something that is desirable for all students to know or be able to perform, that is, it is a kind of ideal that should be attained by all" (FERNANDES, 2020a, p. 4). In other words, they indicate what is relevant to learn and assess by means of the activities proposed.

Each assessment criterion requires the definition of performance levels, which must contain "fundamental guidance, so that students can regulate and self-regulate their progress in the learnings they are expected to achieve" (FERNANDES, 2020a, p. 3).

Criteria and description of performance levels are fundamental elements of the rubrics. Assessment rubrics are simple procedures that can be used to help teachers evaluate a wide range of students' productions and performances (FERNANDES, 2020b). Rubrics can be used in the formative assessment context to give feedback, or in the summative assessment to verify students' learning at the end of a period.

Assessment rubrics include four elements, namely, a) description of the task object of the evaluation; b) criteria; c) performance description levels; and d) the definition of a scale that ascribes each performance a score (Chart 1):

Chart 1 – Example of rubrics for the content ‘vaccines’

Task general description: Text elaboration performance	
Criterion	Performance level descriptions
Understanding the role of vaccines in the control of epidemics.	<ul style="list-style-type: none"> <li>- Shows (0) no understanding</li> <li>- Shows (1) partial understanding</li> <li>- Shows (5) good understanding</li> <li>- Shows (10) excellent understanding</li> </ul>

Source: The authors.

The definition of criteria and rubrics helps students to learn, teachers to teach, and makes the assessment fairer and more democratic when considering the particularities of each student. The information collected about students’ learning must be valued and used to give feedback to students.

The word feedback has English origin, “in which ‘feed’ translates as ‘alimentação’ in Portuguese and ‘back’, can be translated as ‘behind’ or ‘return’” (BRANDALISE *et al.*, 2020, p. 165, author’s emphasis). Therefore, *feedback* can be understood as “retroalimentar, realimentar, in Portuguese, that is giving a reply to certain request or event” (BRANDALISE *et al.*, 2020, p. 165).

According to Fernandes (2009, p. 99), “feedback is vital for the assessment to integrate teaching and learning processes, and particularly, so that assessment can take over its formative nature”. That author explained that feedback might help

[...] students to realize and consolidate what is high quality work and the cognitive and/or metacognitive strategies, knowledges, attitudes, or the abilities they need to develop to understand their learnings (FERNANDES, 2009, p. 99).

In addition, another fundamental aspect in assessment of learning is the diversification of assessment techniques and instruments (FERNANDES, 2009). Lopes and Silva (2020), in their book **50 Técnicas de Avaliação Formativa** (50 Formative Assessment Techniques), revealed that whenever the purpose is to make the classroom assessment practices more formative, there are several resources and techniques that teachers can use. However, the assessment conception is not defined by the instruments or techniques used, but rather by the use, interpretation, and analysis of the results obtained in the teaching-assessment-learning process.

Therefore, if the results obtained are used to give feedback to students to improve their learning, this is characterized as the assessment formative conception. However, when the results are only used to ascribe marks or classifications, the assessment summative conception is employed.

## RESEARCH WAYS

The research that originated this article aimed to analyze the perceptions of Biological Sciences students from a public higher education institution in the state of Paraná regarding theoretical-practical fundamentals of learning assessment, as

discussed in a qualification course developed by the authors as part of the research developed in a master's dissertation.

The course promoted three synchronous meetings via *Google Meet*, which gathered students from the 3<sup>rd</sup> year afternoon and evening courses, and from the 4<sup>th</sup> year afternoon course from a public institution in the state of Paraná.

To keep the confidentiality of the participants, they were codified as follows: L - student, followed by the year studied (3<sup>rd</sup> – third or 4<sup>th</sup> - fourth); the part of the day (N – evening or V - afternoon); and student identification number in the research (01 to 29), for example: L4N07 (student 07 in the fourth year in the evening course) and L3V04 (student 04 in the third year in the afternoon course).

The qualitative approach and the interpretive nature were chosen to develop the investigation because in qualitative research, the main concern is to deepen the understanding of a social group, in an organization, about certain study object etc. (GERHARDT; SILVEIRA, 2009), in which the objects analyzed are not only reduced to numerical variables, but rather considered holistically in the everyday context in which they are inserted (FLICK, 2009).

Regarding ethical norms, the research was submitted to the Research Ethics Committee (CEP), via Brasil Platform, on 7<sup>th</sup> July 2021, and approved on 3<sup>rd</sup> August 2021, according to the Technical Opinion n° 4.881.322.

Due to the pandemic period, which demanded social distancing, all the course meetings and activities developed had to be adapted to the emergency remote teaching.

To produce the research data, a previous online questionnaire was applied aiming to understand students' initial conceptions regarding learning assessment and support the course structuring. At the end of the course, the students were challenged to complete the online statement "I used to think about assessment of learning... but now I know...", created via Google Forms. Twenty-nine students completed the statement and returned to the researchers.

The data was analyzed using the Discursive Textual Analysis methodology - DTA. According to Moraes and Galiuzzi, DTA "corresponds to a methodology that analyzes qualitative information aiming to produce new understandings of phenomena and discourses" (MORAES; GALIAZZI, 2016, p. 13).

The DTA methodology defines four analysis phases, as follows: I – text deconstruction; II – establishment of relations; III – capturing the emerging new; and IV – a self-organized process, in which the three first phases, according to the authors, result in a cycle of operations, which integrate the main elements in this analysis methodology (MORAES; GALIAZZI, 2016).

The DTA starts with a process of deconstruction of the analysis material by means of a unitarization process. In such process, the texts are read, fragmented, and analyzed in detail, highlighting their constituent elements. From this text deconstruction, the analysis/meaning or sense units appear (MORAES; GALIAZZI, 2016).

After this moment, the characterization process starts. In this process, the analysis units previously built up are categorized. From the category set "the descriptions and interpretations that will be part of the exercise of expressing the

new understandings enabled by the analysis are defined” (MORAES; GALIAZZI, 2016, p. 45).

The third moment is the capture of the emerging new. From the unitarization and categorization, metatexts are built up. Such metatexts express the meanings and senses ascribed from a set of texts, resulting in an interpretive synthesis. At this point, new understandings might emerge from categories and subcategories, and the quality of the texts resulting from the analyses, apart from their validity and reliability, depend on the way the researchers undertake the authorship of their arguments (MORAES; GALIAZZI, 2016).

For this reason, metatext generated from the analysis of the object investigated in this study pointed out the perception of Biological Sciences students regarding the theoretical-practical fundamentals of learning assessment after taking part in the qualification course. The analysis is presented in the following section.

### **LEARNING ASSESSMENT FROM THE PERCEPTIONS OF BIOLOGICAL SCIENCES TEACHING UNDERGRADUATE STUDENTS**

The data presented are part of the data collected for the master’s dissertation by the first author, which were collected from a course taught to Biological Sciences teaching undergraduates about the theoretical-practical fundamentals of learning assessment.

The first meeting of the course approached the fundamentals of learning assessment focusing on the concepts of formative and summative assessment, criteria, rubrics, and feedback. At the end of the meeting, aiming at understanding the students’ perceptions about learning assessment, they were asked to complete the following statement: “I used to think about assessment of learnings..., but now I know...”. This question was created in the Google Forms and sent to the participants using a specific link.

Students’ answers to this question were analyzed using the DTA method. The unitarization process, establishment of relations, and categorization, generated the following categories: I – Assessment as a way of monitoring teaching and learning processes; II – Learning assessment criteria; III - Feedback; IV – Learning assessment instruments; and V – Formative and summative assessments.

Next, each of the categories was analyzed.

I - Assessment as a way of monitoring teaching and learning processes. In this category, the students’ perception revealed that they understood learning assessment and the monitoring of teaching and learning processes, as shown by the excerpts below:

L3V03: I used to think about learning assessment in a rather complex and difficult way and could not fully understand how to define the assessment criteria. But now I know that assessment is extremely important in the school environment, it must be simple, focus on learning and the students’ knowledge, and might be a way to help the improvement of the ways a topic is being discussed in the classroom, also improving instruments, and general classroom actions [...].

L3V06: I used to think that learning assessment was a simpler process in which the teacher evaluated whether students had acquired the knowledge exposed or not, but now I know it is a much more complex process and also depends on the teaching-learning process, it involves the school and its surroundings, as a teamwork in which one helps the other, it is not only about student, assessment or teacher. And one of the main foci of assessment is students' development and the absorption of content along with their questioning [...].

L3V07: It was a process in which only the teachers verified, but it is in fact also for the students to be aware whether they are learning. Learning assessment is developed mutually, thinking ways to improve methods during the teaching and learning processes.

L3V14: Before the course, I used to think that the classification by means of tests was the most relevant way of assessing knowledge obtained by the students, but now I know that learning assessment is a continuous process that evaluates students every day in varied ways.

**II – Learning assessment criteria.** This category includes students' reports that highlight the criteria of learning assessment and their importance. The excerpts below show that:

L4V25: Something that made me think a lot was the criteria of assessment to analyze how the learning process is developing, but not only as something the teacher can use during his/her evaluation, but rather as way of making the students get involved and identify what they need to improve during their learning process, making the students reflect upon themselves and the points to be improved, unlike the summative assessment that does not give the students the same opportunity.

L3V06: [...] The assessment must follow criteria since the assessment based on subjective judgement might become personal and harm the students being assessed.

**III - Feedback.** When revealing their perceptions, students cite feedback and its importance, as seen in the excerpts below:

L3N18: [...] I also saw feedbacks as a way of giving marks, rather than a way of showing the student their production, as I know now.

L3V04: [...] the feedback given to students during the formative assessment is highly important in the students teaching/learning process. Also, about feedback, I used to think that there was no specific time to give feedback to students about their performance in activities, but now I know that it should not be delayed.

**IV – Learning assessment instruments.** This category presents the students' statements that highlight the different instruments of assessment of learning, as shown below:

L3V05: I used to think that learning assessment was only a test with questions devised to evaluate students, I used to think in a closed way that would only evaluate with tests and activities, with specific questions. [...] But now I saw that groupwork, presentations, and didactic works can be used so that the students can express their creativity and the knowledge acquired, also conversations and discussions in the classroom, etc. [...].

L3V13: I used to think that there were not many options of assessment, and that, even if I tried, it would result in a traditional paper-based evaluation, but now I know that there are many ways of evaluating learning and that many times, the different is more efficient, more motivating, and also helps their learning.



V – Formative and summative assessments. In this category, students' perceptions revealed the use of formative and summative evaluations in sciences and biology lessons, as reported in the excerpts:

L3V03: [...] in addition, I know that we should give great importance to diagnostic and formative assessment, but it is necessary to work with summative evaluations too; however, always remembering the difference between evaluating and classifying.

L3V04: I used to think that in the classroom, it was mandatory to use predominantly the summative assessment, but we do not have to use only this type of assessment, we can also use formative assessment. By attending the workshop first meeting, I managed to understand that the summative assessment does not have to have a classificatory character only [...].

L3N18: I understood formative and summative assessment as modalities that should be worked individually, either one or the other, and now I understand that it is possible to use both, and this is the best thing to be done [...].

### **METATEXT: SENSES AND MEANINGS IN LEARNING ASSESSMENT BY UNDERGRADUATES**

The participants' reports showed that they understood assessment as the monitoring of the teaching and learning processes, and a support to both students and teachers. According to Fernandes (2009), the function of assessment of learnings is to lead students to learn more, with better understanding, and for this reason, it must be carried out integrated to teaching, coherent with the learnings to be developed, and according to the curriculum devised. It must also take the school context under consideration, the specificities of each student, and the data produced by it must be valued and used to promote actions to improve teaching and learning processes.

When addressing the importance of the criteria of assessment of learnings, students showed their concern with carrying out evaluations based on criteria. Setting criteria for the assessment of learnings is essential in the search of developing evaluations in a formative conception. When criteria are set, there is no risk of comparison of students' learnings based on the marks or with other groups of students since the comparison is only made with their own learnings and development during the teaching and learning processes (FERNANDES, 2020a).

Another relevant point to highlight is that the students started to understand the importance of feedback and revealed knowledge of some of its principles. According to Fernandes (2009), "[...] feedback is crucial for the assessment to integrate teaching and learning processes, and particularly for the assessment to fulfil its formative nature" (FERNANDES, 2009, p. 99). As stated by Machado (2020), feedback provides students with the necessary information to understand where they are in relation to their learnings and what they can do to continue. At the same time, it can also help them develop a feeling of control over their own learning, involving them more and more in the knowledge construction process.

Some students revealed their understanding regarding assessment of learnings in biological sciences, and emphasized assessment instruments and/or techniques such as groupwork, presentations, discussions, etc. According to Fernandes (2009), the activities assigned to students should preferably "be of teaching, assessment and learning, they must be thoroughly selected and

diversified, represent the curriculum structuring fields and activate more complex thinking processes” (FERNANDES, 2009, p. 61). For this reason, instruments must be diversified and go beyond traditional tests since it is not possible to assess learnings by means of a single instrument, in a single moment in a two-month period or even within a semester.

Finally, we also observed that the participants understood the importance of developing formative and summative assessment, which complement one another, in sciences and biology classes. For Fernandes (2009), the conceptual clarification of the formative and summative assessments is still a problem to be tackled since formative assessment practices are not commonly seen in classrooms. According to that author, part of the problem is due to teachers’ conceptual understanding and for this reason undergraduates should be exposed to them.

Considering the data presented, it is possible to evidence the Biological Sciences undergraduate students regarding assessment of learnings after their participation in the qualification course. They showed understanding of the concepts of criteria, feedback, instruments of assessment of learnings, formative and summative assessments, and reported seeing evaluation as the monitoring of teaching and learning processes, and as elements of a formative conception of assessment of learnings.

## **FINAL CONSIDERATIONS**

This study aimed to analyze the perceptions of Biological Sciences teaching undergraduate students from a public higher education institution in the state of Paraná regarding theoretical and practical fundamentals of assessment of learnings. The participants attended a qualification course developed by the authors addressing assessment of learnings.

The analysis of the data produced in the research showed that after attending the course, the undergraduates revealed knowledge of some principles and concepts of assessment of learnings such as formative and summative assessments and their importance, criteria, feedback, and instruments. They also saw assessment as a way of monitoring teaching and learning processes.

The participants emphasized that they used to understand assessment of learnings as a simple verification of students’ learnings, but after their participation in the qualification course, they could realize that it is a complex procedure for monitoring teaching and learning processes, which can help students’ learning and the improvement of teachers’ work.

Furthermore, they highlighted the importance of setting criteria to make the assessment fairer and really committed to the teaching and learning process improvement. The criteria guide teachers regarding what to evaluate so that the students are aware of what is expected from them, that is, the importance of learning.

The participants also referred to feedback and its relevance in the development of formative assessment. When evaluating students, they must know about their learnings and what is needed to improve their performance. Assessment of learnings as described in this study considers that the results

obtained by means of evaluation must be mobilized to give students' feedback and foster their autonomy in relation to their learnings and what they can/must do to improve them.

When revealing their perceptions of assessment of learnings, some of the undergraduates mentioned the instruments used such as groupwork, presentations, discussions, etc. They understood the need for varying the instruments to assess students' learnings. Such understanding is relevant since students learn in different ways and at difference paces, therefore, teachers must consider their particularities to carry out better evaluations.

The participants also understood the need for developing formative and summative assessments in a complementary way in sciences and biology classes. This is a more recent understanding regarding assessment of learnings as defended in this study and considered in the discussion of the qualification course developed. Fernandes (2009) observed that developing summative evaluations to complement the formative assessment might produce significant improvement of the evaluations and, consequently, of teaching and learning processes.

Taking all that into account, we emphasize that there are many challenges in the reflection upon assessment of learnings in the initial education of teachers in the Biological Sciences area. It is necessary to deepen theoretical-practical issues regarding assessment of learnings in this phase of their professional education, so that undergraduates have enough input to develop assessment practices that are more committed to the improvement of students' learnings in their future teaching practice.

# EU COSTUMAVA PENSAR SOBRE AVALIAÇÃO DAS APRENDIZAGENS... MAS AGORA EU SEI...: PERCEPÇÕES REVELADAS POR LICENCIANDOS EM CIÊNCIAS BIOLÓGICAS

## RESUMO

Ao considerar a formação inicial de professores de Ciências Biológicas em relação ao conhecimento sobre avaliação das aprendizagens, este trabalho, de abordagem qualitativa e cunho interpretativo, teve como objetivo analisar as percepções dos licenciandos de Ciências Biológicas de uma instituição pública paranaense a respeito dos fundamentos teórico-práticos da avaliação das aprendizagens, após a participação no curso de formação desenvolvido pelas autoras sobre avaliação das aprendizagens. A análise dos dados, coletados via questionário *on-line*, foi realizada por meio da Análise Textual Discursiva (ATD) e demonstrou que, após a participação no curso, os licenciandos revelaram alguns princípios e conceitos da avaliação das aprendizagens, como: avaliação formativa e somativa e sua importância, critérios, *feedback*, instrumentos, e compreenderam a avaliação como acompanhamento dos processos de ensino e de aprendizagem. As percepções dos licenciandos revelaram uma concepção formativa de avaliação, e evidencia-se a necessidade de aprofundamento dos fundamentos teórico-práticos da avaliação das aprendizagens na formação inicial de professores de Ciências Biológicas.

**PALAVRAS-CHAVE:** Avaliação da/para aprendizagem. Formação inicial de professores. Licenciatura em Ciências Biológicas.

## NOTE

1 This article is a longer version of a work presented /published in the VII Simpósio Nacional de Ensino de Ciência e Tecnologia – SINECT (VII Science and Technology Teaching National Symposium), held in 2022.

## REFERENCES

ANDRE, M. E. D. A. *et al.* O papel do professor formador e das práticas de licenciatura sob o olhar avaliativo dos futuros professores. **Revista Portuguesa de Investigação Educacional**, Lisboa, v. 12, p. 101-123, 2012. Available at: <https://revistas.ucp.pt/index.php/investigacaoeducacional/article/view/3377>. Access on: 15 Jul 2022.

BORRALHO, A. *et al.* Avaliação das (para as) aprendizagens das questões teóricas às práticas de sala de aula. *In*: ORTIGÃO, M.; FERNANDES, D.; PEREIRA, T.; SANTOS, L. (Orgs.). **Avaliar para aprender em Brasil e em Portugal**: perspectivas teóricas, práticas e de desenvolvimento. Curitiba: CRV, 2019. p. 219-238.

BRANDALISE, M. A. T. *et al.* *Feedback* na avaliação formativa. *In*: BRANDALISE, M. A. T. (Org.). **Avaliação educacional**: interfaces de conceitos, termos e perspectivas. Ponta Grossa: Ed. UEPG, 2020. p. 165-173.

FERNANDES, D. **Avaliar para aprender**: fundamentos, práticas e políticas. São Paulo: Unesp, 2009.

FERNANDES, D. **Folha critérios de avaliação**. Lisboa: Projeto MAIA, 2020a.

FERNANDES, D. Para um enquadramento teórico da avaliação formativa e da avaliação somativa das aprendizagens escolares. *In*: ORTIGÃO, M.; FERNANDES, D.; PEREIRA, T.; SANTOS, L. (Orgs.). **Avaliar para aprender em Brasil e em Portugal**: perspectivas teóricas, práticas e de desenvolvimento. Curitiba: CRV, 2019. p. 139-163.

FERNANDES, D. **Rubricas de avaliação**. Lisboa: Projeto MAIA, 2020b.

FERREIRA, F. M. **Avaliação das aprendizagens**: uma proposta de formação para licenciandos em Ciências Biológicas. Orientadora: Mary Ângela Teixeira Brandalise. Ponta Grossa. 205 f. 2022. Dissertation (Sciences and Mathematical Education Teaching Master's Program) – State University of Ponta Grossa, Ponta Grossa, 2022. Available at: <https://tede2.uepg.br/jspui/handle/prefix/3720>. Access on: 15 Jul 2022.

FLICK, U. **Introdução à pesquisa qualitativa**. 3. ed. Porto Alegre: Artmed, 2009.

GATTI, B. A formação inicial de professores para a educação básica: Pesquisas e políticas educacionais. **Estudos em avaliação educacional**, São Paulo, v. 25, n. 57, p. 24-54, 2014. Available at: <https://publicacoes.fcc.org.br/eae/article/view/2823>. Access on: 20 Jun 2022.

GERHARDT, T. E.; SILVEIRA, D. T. (org.). **Métodos de Pesquisa**. Porto Alegre: Editora da UFRGS, 2009.

LOPES, J. P.; SILVA, H. S. **50 Técnicas de avaliação formativa**. 2. ed. Lisboa: PACTOR, 2020.

MACHADO, E. **Feedback**. Projeto de Monitorização Acompanhamento e Investigação em Avaliação Pedagógica. Lisboa: Ministério da Educação/Direção-Geral de Educação, 2020. Available at: <https://afc.dge.mec.pt/sites/default/files/2021-04/Folha%203%20Feedback.pdf>. Access on: 20 Jun 2022.

MENDES, O. M. **Formação de professores e avaliação educacional: o que aprendem os estudantes das licenciaturas durante sua formação**. 214 f. 2006. Thesis (Education Doctoral Program) – University of São Paulo, São Paulo, 2006. Available at: <https://teses.usp.br/teses/disponiveis/48/48134/tde-21062007-095349/pt-br.php>. Access on: 15 Jul 2022.

MORAES, R; GALIAZZI, M. **Análise Textual Discursiva**. 3. ed. Ijuí: Unijui, 2016.

SANTOS, L. Reflexões em torno da avaliação pedagógica. In: ORTIGÃO, M.; FERNANDES, D.; PEREIRA, T.; SANTOS, L. (Orgs.). **Avaliar para aprender em Brasil e em Portugal: perspectivas teóricas, práticas e de desenvolvimento**. Curitiba: CRV, 2019. p. 165-190.

SOARES, S. L. **A avaliação para as aprendizagens, institucional e em larga escala em cursos de formação de professores: limites e possibilidades de interlocução**. 331 f. 2014. Thesis (Education Doctoral Program) – University of Brasília, Brasília, 2014. Available at: [http://icts.unb.br/jspui/bitstream/10482/17738/1/2014\\_S%C3%ADlviaL%C3%BAciaSoares.pdf](http://icts.unb.br/jspui/bitstream/10482/17738/1/2014_S%C3%ADlviaL%C3%BAciaSoares.pdf). Access on: 20 Jul 2022.

TEIXEIRA, P. M. M. **Pesquisa em Ensino de Biologia no Brasil (1972-2004): um estudo baseado em dissertações e teses**. 413 f. 2008. Thesis (Education College) – State University of Campinas, Campinas, 2008. Available at: <https://repositorio.unicamp.br/acervo/detalhe/449571>. Access on: 15 Jul 2022.

VEIGA, L. P. A. *et al.* **Didática**: entre o pensar, o dizer e o vivenciar. Ponta Grossa: UEPG, 2012.

VILLAS BOAS, B. M. **Avaliação**: interações com o trabalho pedagógico. Campinas: Papirus, 2017.

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