

# Portfolio as a teaching, learning and evaluation strategy: perception of dental students and professors

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## ABSTRACT

This study aimed to analyze the perception of students and professors of dentistry, regarding the creation and presentation of the reflective portfolio such as teaching, learning, and evaluating strategy, in the Integrated Clinic of the Dentistry Course at the Universidade Estadual de Feira de Santana (UEFS). It is a cross-sectional descriptive qualitative study, and the data collection was during the second semester of 2014. The subject of this study was the professors and the students enrolled in the semester. The data consisted of a semi-structured interview with nine questions for students and seven for professors. The data were analyzed by The Content Analysis method. Three hypotheses were tested to present the results; 1. The use of the portfolio is a strategy that helps the understanding by students and professors about what was taught and, consequently, higher levels of significant learning; 2. The portfolio is an instrument that facilitates the process of re-elaboration of knowledge by students and professors. Also, it offers an opportunity for reflection on the progress of students. Besides, it contributes to the self-assessment of both; 3. The application of the portfolio helps the participative management in the formative assessment strategy. While the professor, who is a facilitator in the development of reflective knowledge, allows the student to develop autonomy, independence, creativity, and self-criticism skills. Thus, the creation of the portfolio by trainees of Integrated Dental Clinic is an inducer and enhancer of teamwork, being an educational strategy that enables a new meaning and deepens knowledge, at the same time, it gives the reinforcement of learning. The creation of the clinical portfolio requires a level of critical reflection that helps the development of the student, as a citizen and professional; encouraging active participation in real-world events, especially those related to health care. The academic portfolio can be established as a teaching, learning, and formative, critical, reflective, creative, and dialectical strategy that encourages and values student participation. The academic portfolio can be used as a teaching, learning, and formative, critical, reflective, creative, and dialectical strategy that encourages and values student participation. Also, in the Dentistry internship, it is a way to expand, rethink and innovate undergraduate education from the perspective of an instrument/strategy for stimulating academic thinking.

**Descriptors:** Portfolio. Teaching. Educational Evaluation.

## 1 INTRODUCTION

The use of the portfolio has stood out among the methodological resources applied in the teaching-learning process, as well as in student assessment, establishing itself as a strategy tool for stimulating reflective thinking. The portfolio enables the documentation, record, and structure of the process of learning by students since the construction is guided by the previous agreement between professor and students. Therefore, it enables collaborative work in articulating and solving complex problems<sup>1</sup>.

The term portfolio is originally from the Italian *portafoglio*, which means a flat case for loose sheets. It was used in plastic arts, in which the artist made a selection of works that expressed his production. In the educational environment, the idea remains the same. The portfolio allows the work developed by the student to be procedurally observed, seeking to take the assessment beyond the levels of tests and exams<sup>2</sup>.

The portfolio is compound by the student's productions, which represent evidence of his learning. The student organizes it within the parameters agreed at the beginning of the school term. In this way, the student has autonomy about his portfolio presentation format, as long as he does not oppose the educational objectives previously established. The portfolio is an assessment procedure that allows students to participate in formulating their learning objectives<sup>3</sup>. The portfolio provides moments of dialogue between individuals involved in the process of building knowledge when used as a mediating display for planning, creation, and outcomes in activities developed by dentistry students. So, professors and students can follow and evaluate the student's progress together, with a consequent appropriation of knowledge.

Because of the relevance of the theme, this

study was performed with the students of the Dentistry course at the Universidade Estadual de Feira de Santana (UEFS), Bahia. The portfolio was used in the subject Integrated Clinic, as a research instrument, since the teaching staff found in the portfolio, as a mediating tool for the assessment of learning, favorable subsidies for the construction of knowledge.

In the first classes in which the portfolio was an element of evaluation, the portfolios were collections of clinical procedures performed by students throughout the care of patients, presenting, for the most part, no reflection on the learning considered significant. However, over time changes have been taking place.

Despite recognizing the importance of student autonomy in the development of its portfolio, the Integrated Clinic of the Dentistry Course at UEFS requires some mandatory topics in its construction: the treatment plan approved by each patient assisted by the student, the service schedule, and description of the procedures planned for each service. Thus, to outline what makes up the portfolio under study, it is necessary to contextualize the teaching methodology used in the subject.

The creation of the portfolio begins after the consultation, in which the student conducts at least an interview, physical examination, filling out the medical record, and requesting additional exams. Then, the student and the supervising professors discuss the clinical needs observed during the examination of the patient. After that, the student reports the clinical condition of the patient and the guidelines provided by the professors after the discussion. Also, the questions and the perception about the challenges of clinical assistance. This description is free, it is linked to the profile of each student and serves as a guide for the

bibliographic survey to be carried out to support the first mandatory element - the treatment plan, demonstrating the theoretical foundation for such construction. Thus, the portfolio should contain scientific articles, photographs, drawings, graphs, records, organization charts, or any graphic elements that constitute the study.

The treatment schedule is established after the agreement of the treatment plan and the patient's approval. The schedule helps to organize the clinical assistance and guides the preparation for the second mandatory element of the portfolio, the description of procedures of the clinical session, which should be given to the professor before each procedure.

In these records, students describe difficulties, obstacles, or facilities, since, much more than a classificatory resource, this element of the portfolio has the purpose of stimulating the advanced study to organize the daily planning adequately and integrally, and consequently provide the development of critical and reflective thinking. Additionally, the student may record modifications in clinical planning.

The portfolio also includes the summative assessment scale, consisting of the indicators: knowledge (previous study and theoretical appropriation); attitude (application of the biosafety protocol, material and equipment care, organization of the service desk, presentation of necessary material); and procedure (manual dexterity and clinical actions to finish the planned treatment plan). The professor supervisor fills the scale at the end of each shift for procedural feedback.

This study aimed to analyze the perception of students and professors of dentistry, regarding the creation and presentation of the reflective portfolio such as teaching, learning, and evaluating strategy, in the Integrated Clinic

of the Dentistry Course at the Universidade Estadual de Feira de Santana (UEFS).

## **2 MATERIAL E METHODS**

It is a cross-sectional descriptive qualitative study, and the data collection was during the second semester of 2014.

The study population was the professors and the students from the subject Integrated Clinic enrolled in the semester at UEFS.

The research project was approved by CEP UEFS (CAAE 32743514.7.0000.0053). Eleven students and seven professors participated in the study, who agreed and signed the Informed Consent Form.

The data consisted of a semi-structured interview with nine questions for students and seven for professors, carried out by a previously trained researcher. The questions analyzed in the script are shown in Chart 1.

The data were evaluated using the Content Analysis method. The use of this methodological technique allowed to give meaning and meaning to the diversity of information present in the ideas expressed by teachers and students about the portfolio as an instrument of teaching, learning, and evaluation that enabled the presentation of these results in two thematic categories: "Process of construction of the portfolio as a teaching, learning strategy" and "Presentation and analysis of the portfolio as an evaluation resource".

The pre-analysis stage involved the "floating" reading of the questionnaires applied to students and professors in the perspective of formulating the indicators that could guide the interpretation and formal organization of the collected data. It was sought at this time to obey the rules of exhaustiveness (exhaust information, in a perspective of not omitting anything); homogeneity (subdividing data by themes, obtained by similar individuals, that is, those

from students and those from teachers); consistent with the content and objective of the pertinence (information acquired that is research)<sup>4</sup>.

Chart 1. Interview questions

STUDENTS	PROFESSORS
<ol style="list-style-type: none"> <li>1. How do you evaluate the portfolio of activities as a teaching/evaluation tool?</li> <li>2. What are the portfolio's strengths?</li> <li>3. What are the weaknesses of the portfolio?</li> <li>4. In what aspects the portfolio should improve?</li> <li>5. What other instrument could be used for teaching and evaluating clinical activities in the Integrated Clinic, replacing or complementing the portfolio?</li> <li>6. What skills do you believe you have acquired/exercised from the participatory methodology and building portfolios used in the discipline?</li> <li>7. How do you feel when your portfolio is used to evaluate you by the professor?</li> <li>8. Is the portfolio a coherent form of evaluation?</li> <li>9. Define in one sentence the feeling at the end of the subject. These roadmaps were designated primary sources.</li> </ol>	<ol style="list-style-type: none"> <li>1. Describe how the portfolio of activities is created in your subject.</li> <li>2. How do you rate this teaching/assessment tool? What are the portfolio's strengths?</li> <li>3. What are the weaknesses of the portfolio?</li> <li>4. In what aspects this instrument be improved?</li> <li>5. What other instrument could be used for teaching and evaluating clinical activities, replacing or complementing the portfolio?</li> <li>6. If you could choose between the traditional methodology and the active methodology as a learning tool, what technique would you choose? Think about your answer.</li> <li>7. The portfolio is a coherent form of evaluation?</li> </ol>

In the exploration/preparation stage of the material, the information was organized to elucidate the following hypotheses: 1. The use of the portfolio is a strategy that favors a greater understanding by students and professors about what the teaching and, consequently, higher rates of meaningful learning; 2. The portfolio is a facilitating tool in the development of re-elaboration of knowledge, and it offers an opportunity to reflect on students' progress. Also, it contributes to the self-evaluation of both the professors and the student; 3. Applying the portfolio helps participatory management in the formative assessment strategy when the professor, as a facilitator during the development of reflective knowledge, allows the student to develop autonomy, independence, creativity, and self-criticism.

In the results phase, supported by the raw data, the researchers made the results significant

and valid through inference and interpretation of concepts from the literature review and the communication between the subjects, which established the three hypotheses. This stage aimed to show if there is a line of reasoning that unifies the concepts and hypotheses, at the same time that it seeks to clarify the similarities that may exist between the different hypotheses so that the conception may or may not fit, and if the hypotheses raised are true or objectionable.

### 3 RESULTS

This chapter explains the information and reflections of the students and professors. It allowed the researchers to test the three hypotheses. It is worth mentioning that the hypotheses were created from the thematic categories "Process of creation the portfolio as a teaching, learning strategy" and "Presentation and analysis of the portfolio as an evaluation

resource”

Charts 2 to 4 summarize the impressions

#### 4 DISCUSSION

The active methodologies are grounded on teaching strategies based on the critical-reflexive pedagogical conception, which allows reading and intervention on the reality, favoring the interaction between the different subjects and valuing the collective construction of knowledge and its diverse knowledge and learning scenarios. Also, they are practices that stimulate creativity in building solutions to problems and that promote freedom in the process of thinking and acting<sup>1</sup>.

Among the innovative resources of the teaching-learning and assessment process, the portfolio highlights as a strategic tool for stimulates reflective thinking.<sup>1</sup>. Chart 2 shows, in the column "confirming the hypothesis", the impression revealed by students and professors that the precision of the creation of the clinical

expressed by interns and teachers who confirm and deny the hypotheses.

portfolio is known as a learning tool that allows the development of skills to assess, systematize and decide the most appropriate behaviors, based on scientific evidence, guiding decision-making. When analyzing the contributions of the portfolio presented by students, we can see that this instrument stimulates the study in advance to organize the treatment planning adequately and integrally, consequently providing the development of critical and reflective thinking so that the student starts to have an active stance in the construction of knowledge. Souza et al<sup>5</sup> recognize that the application of active methodologies proposes a change in the form of development of academic knowledge, encourages students to relate their experiences and interact on issues and, later, conclude a more qualified degree.

Chart 2. Hypothesis 1 - The use of the portfolio is a strategy that favors a greater understanding by students and teachers about what the teaching, and consequently, higher levels of significant learning

	STUDENTS	SUPERVISING PROFESSORS
Hypothesis' confirmation	<p>It helps a previous study for treatment planning.</p> <p>It motivates the student to complete his obligations.</p> <p>It promotes the study and gives more confidence.</p> <p>It enables to view the academic production.</p> <p>It is essential for complete learning.</p>	<p>It is a tool that combines the evaluation of the exercise of the creation of theoretical knowledge with the development of motor skills.</p> <p>In the internship, which is the curricular element that I am into, I believe that the use of resources from the active methodology expands the opportunity of learning.</p>
Hypothesis' denial	<p>All professors need to know how it works.</p> <p>There was a Deficiency of the assessment of treatment planning by the professors.</p> <p>The professors do not require treatment planning and assign high marks, thus encouraging the student to the bad habit of not planning the procedure.</p> <p>It needs a further complete discussion about what is going to be.</p>	<p>It should not be extensive, as it makes the daily routine of the clinic difficult.</p> <p>Difficult to tabulate results.</p> <p>There are flaws in this methodology, as the professor still applies it much more as an instrument of classificatory assessment. In other words, what has to be changed is the way it is applied, and not the portfolio itself. If I get to the correct use of the portfolio, I may detect the points to improve it.</p> <p>It requires preparation and calibration of the professor involved, also the constant dialogue between the subjects, which has not been happening in practice.</p> <p>There is a lack of “space” that encourages the most direct expression of the assessment, such as difficulties, strengths, and weaknesses. There is also no space for the teacher to express his comments - feedback.</p>



Chart 3. Hypothesis 2 - The portfolio is a facilitating tool in the process of development of knowledge by students and professors, offering an opportunity for reflection on the progress of students, in addition to contribute to the self-evaluation of both.

	<b>STUDENTS</b>	<b>SUPERVISING PROFESSORS</b>
<b>Hypothesis' confirmation</b>	<p>Very good. Identifies where the student needs to improve.</p> <p>Evaluate your performance and disability from the daily grades, and thus strive to improve.</p> <p>Professor/student interaction.</p> <p>The planning of treatment procedures and discussion with the student before execution.</p> <p>It makes it possible to experience situations not yet performed.</p>	<p>It is a dynamic tool created consequently to the clinic's demands. It facilitates the student's self-assessment and progress during the semester.</p> <p>It is an innovative, interactive, reflective tool and built during the semester by the interaction between professors and students.</p> <p>It enables transparency for all subjects involved in the learning process.</p>
<b>Hypothesis' denial</b>	<p>Inflexible evaluation</p> <p>Lack of coherence between production and evaluation.</p> <p>Lack of clear criteria and subjective criteria.</p> <p>There is no standardization among professors.</p>	<p>It needs to improve the perception and awareness of professors and students regarding the portfolio, highlighting its benefits for deepening knowledge in the learning process to be applied with its guiding principles.</p> <p>It needs student's commitment to autonomy in the construction of knowledge.</p>

When analyzing chart 3, it can see that statements from students and teachers reinforce the characteristic attributed by Silva et al.<sup>6</sup> to the portfolio (confirmation of hypothesis 2). When analyzing the questionnaires answered by the students was found that the portfolio was considered a good instrument, even pointed out as necessary, being useful for the student to identify items in which he needs to improve, therefore constituting a self-assessment instrument.

However, in the arguments considered hypothesis' denial, some characteristics such as stimulating autonomy for continuing education and individualization of learning, need to be better elucidated, for both students and professors, since the portfolio as a guiding strategy infers a different dynamic for the daily study of each student. However, this resource is a concrete mechanism of a summative evaluation of individuals in the process of professional formation. This dual

function of the portfolio may have led some students to consider the portfolio as a rigid and sometimes unfair evaluation method when considering its subjective and unclear criteria. Also, the portfolio was considered by these students as something unnecessary where it should serve as a stimulus and not as an evaluative activity.

According to some interviewed students, in some situations, the portfolio is not inspected daily, so that the students' performance is given daily grades without due assessment. Still, about the attribution of grades for the portfolio, the score stood out subjectively without considering the criteria expressed in the evaluation scale and without standardization among professors. In analyzing this context, it is worth noting that the portfolio in university education, or any other active teaching-learning methodology, is not something vague and without parameters for monitoring and evaluation.

Chart 4. Hypothesis 3 - The application of the portfolio promotes participative management in the formative assessment strategy, in which the professor, as a facilitator of the process of building reflective knowledge, allows the student to develop the skills of autonomy, independence, creativity, and self-criticism

	<b>STUDENTS</b>	<b>SUPERVISING PROFESSORS</b>
<b>Hypothesis' confirmation</b>	<p>With the portfolio, knowledge is developed and not just passed on. Very good and often necessary. Very good. Identifies where the student needs to improve. It does not cause a bad or unfair impression. I feel encouraged to improve, although sometimes I do not think the evaluation is fair. Self-criticism. Power of clinical analysis.</p>	<p>It stimulates autonomy in the development of knowledge. It creates habits and routines favorable to the professional training process. It creates the possibility of student self-assessment. It stimulates autonomy in the development of knowledge. It allows teaching support for the theoretical improvement of the applied techniques in patients' care. It is a complete archive of the evaluation process, allowing both teacher and student to have a notion of the evolution of the activities developed and accurately guide the final grade. A portfolio is an innovative tool, enabling a formative evaluation, in which professor and student can follow the development of clinical learning. However, it is an instrument that requires more time from the professor dedicated individually for each student for discussion and improvement of the content archived in the portfolio. When this time is not available, the portfolio becomes just a file.</p>
<b>Hypothesis' denial</b>	<p>Some professors do not look and do not correct. Lack of daily inspection by a professor. Some professors do not ask for planning and assign high marks, thus encouraging the student to the bad habit of not planning the procedure. It should serve as an incentive and not as an assessment tool.</p>	<p>The professor must leave the situation of the holder of knowledge to enable the discussion of the experience brought (developed) by the student. It requires preparation and calibration of the professors involved, also the constant dialogue between the subjects, which has not been happening in practice. There are flaws in this methodology, as the professor still applies it much more as an instrument of classificatory assessment. In other words, what has to be changed is the way it is applied, and not the portfolio itself. If I get to the correct use of the portfolio, I may detect the points to improve it. The professors need to be training, aware, and constant pedagogical work of preparing. Similarly, it is necessary to explain to the students the meaning and methodology of the portfolio. All involved must be aware that it is a dynamic tool under construction, which needs to be reflected and evaluated as an instrument. If it is necessary, it may be adjusted and modified.</p>

University professors must assume their continuing education, update themselves on efficient pedagogical resources in professional training and adult education. For this reason, studies show the need for qualification on active methodologies because, despite the obstacles in the utilization of these methods, studies show positive results in the construction of the student's autonomy when these methodologies are applied<sup>3,7,8</sup>. It is worth noting that even today the lack of theoretical references to planning the pedagogical action in the training of health professionals and the excessive use of traditional teaching techniques by university professors hinders a critical analysis of the applied method.

Based on the national curriculum guidelines for dentistry courses, pedagogical actions must occur in an articulated and integrated way among health workers, users, and civil society and convergent with the proposals of health services. Thus, it is necessary to improve effective learning methods that provide teaching-service interaction. A suggestion by the students in the researched group was about monitoring the creation of the portfolio. They suggest it may be continued and supervised by the professors more effectively on the theoretical reference and more flexible on assessing the presentation. Another suggestion was the need for a conversation with the students to explain the portfolio before starting it, clarifying all the items that will be required in the evaluation. Within this context, we can see that the portfolio is well accepted as part of the evaluation process, without the rigidity of the summative evaluation.

On the other hand, the portfolio also encourages students to collect their reflections and impressions about the subject, opinions, questions, difficulties, reactions to the topics and texts studied, teaching techniques, feelings, and situations experienced in interpersonal

relationships. It contributes to the evaluation of the student, the professor, contents, teaching-learning methodologies, as well as to assess the impact of the subject<sup>9</sup>.

The use of the portfolio in the Supervised Internship became efficient as an instrument capable of documenting actions and reflections in the dental clinic, constituting itself as a tool that facilitated the learning process while also giving a new meaning to the role of the supervisor professor, and consequently the method of teaching. Students and professors realized that the preparation/structuring of the portfolio ensured an improvement in the quality of the students' learning, and at the same time, led to the re-elaboration of the teaching actions to carry out the teaching process. It should emphasize that during the school period, students and professors experienced moments of teaching/learning, characterizing the portfolio as a resource that facilitates the exchange of knowledge and experiences. Also, it undoes the still hegemonic thought that the professor is the only source of knowledge and the student is a null element, as a receptacle of ready-made knowledge. However, students and professors agreed that some professors do not act according to the portfolio's proposal as a tool that facilitates the development of autonomous and reflective knowledge. It is not a failure of the instrument but needs to be followed by planned teaching actions.

Alvarenga and Araujo<sup>10</sup> recommend the use of some indicators to monitor the construction of the portfolio, for example, organization, documentation, and demonstration of the student's knowledge about the content developed; the presence of reflections on the themes; evidence to demonstrate how progress has happened; demonstration of the knowledge obtained and its application; student's reflections



with evidence or indicators of progress in factual, conceptual, attitudinal and procedural learning.

Although students do not always observe the coherence among the elaboration of the portfolio, the assistance provided to users of the clinic school service, and what was determined by the professor in the evaluation grade, some students manifested a sense of injustice at the completion of the subject. The feeling of the students, despite all the critiques, was an accomplishment, development of skills and knowledge, considering the portfolio as essential for complete learning. Even when students were asked about another instrument to replace the portfolio, they affirmed that a portfolio is a valid form of assessment but it should be restructured, including a complete discussion about what will be done and having the self-assessment of the student as an addition, not having another instrument as a substitute, since in the portfolio the knowledge is built and not just passed on.

## 5 CONCLUSIONS

The construction of the portfolio by students of the Integrated Dental Clinic is a potent inducer and enhancer of teamwork, establishing as an educational strategy that allows to refine and deepen knowledge, at the same time that promotes the consolidation of learning.

The creation of the clinical portfolio requires the student a level of critical thought that helps in the student's development as a citizen and professional. Also, it encourages active participation in real-world events, especially those related to health.

The academic portfolio is accepted as a teaching, learning, formative evaluation, critical, reflective, creative, dialectical strategy that encourages and values student participation. The use of the portfolio in the dentistry internship is a way to expand, rethink and innovate

undergraduate education from an instrument/strategy for stimulating academic thinking.

## RESUMO

### **Portfólio como estratégia de ensino, aprendizagem e avaliação: percepção de discentes e docentes de Odontologia**

O objetivo do presente estudo foi analisar a percepção de estudantes e professores de odontologia, a respeito do processo de construção e apresentação do portfólio reflexivo enquanto estratégia de ensino, aprendizagem e avaliação, na disciplina Clínica Integrada do Curso de Odontologia da Universidade Estadual de Feira de Santana (UEFS). Trata-se de um estudo transversal de natureza qualitativa descritiva, cuja coleta de dados se deu durante o período letivo do semestre 2014/1. A população do estudo foram os professores da referida disciplina, bem como os estudantes matriculados no semestre em que a pesquisa foi desenvolvida. A coleta de dados foi realizada por meio de entrevista semiestruturada, contendo nove questões para estudantes e sete para professores. Os dados foram avaliados a partir do método de Análise de Conteúdo. Para apresentação dos resultados foram elaboradas três hipóteses: 1. O uso do portfólio constitui uma estratégia que favorece maior compreensão por estudantes e professores a respeito do que foi ensinado e, conseqüentemente, índices mais elevados de aprendizagem significativa; 2. O portfólio se constitui um instrumento facilitador no processo de reelaboração do conhecimento por estudantes e professores, oferecendo oportunidade de reflexão sobre o progresso dos estudantes, além de contribuir para a autoavaliação tanto do corpo docente quanto discente; 3. A aplicação do portfólio favorece uma gestão participativa na estratégia de avaliação formativa, em que o docente, enquanto sujeito facilitador do processo de construção do conhecimento reflexivo, possibilita ao estudante desenvolver as competências de autonomia, independência, criatividade e autocrítica. Dessa forma a construção do portfólio por estagiários em

Clínica Integrada Odontológica se constitui um potente indutor e potencializador do trabalho em equipe, se estabelecendo como estratégia educacional que permite (re)significar e aprofundar o conhecimento, ao tempo que propicia a consolidação do aprendizado. A construção do portfólio clínico exige do estudante um nível de reflexão crítica que favorece o crescimento do estudante, enquanto cidadão e futuro profissional; estimulando a participação ativa nos acontecimentos do mundo real, principalmente aqueles ligados à saúde. O portfólio acadêmico pode ser admitido como estratégia de ensino, aprendizagem e avaliação formativa, crítica, reflexiva, criativa e dialética, que estimula e valoriza a participação do aluno. Ademais, a utilização do portfólio no estágio em Odontologia é uma maneira de ampliar, (re)pensar e inovar o ensino de graduação na perspectiva de um instrumento/estratégia de estimulação do pensamento acadêmico.

**Descritores:** Portfólio. Ensino. Avaliação Educacional.

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