

Teacher Education for Sustainability: reflections from a project development¹

Formation des enseignants à la durabilité : réflexions sur le développement d'un projet

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ABSTRACT. The project Schools educating for sustainability: Proposals for and from in-service teacher education - TEDS - Teacher education for sustainability, 2019- 1-PT01-KA201-060830, an Erasmus + project, was born from the desire to contribute to teacher education programs for sustainability, aiming to ensure inclusive and quality education and to Goal 4 of the Sustainable Development Goals. This text presents the development of the TEDS project and its results, reflecting on key ideas of education for sustainability in contexts of in-service teacher education in European contexts.

RESUMÉ. Le projet Schools educating for sustainability : Proposals for and from in-service teacher education - TEDS - Teacher education for sustainability, 2019- 1-PT01-KA201-060830, projet Erasmus +, est né de la volonté de contribuer à la formation d'acteurs éducatifs, enseignants et formateurs, au développement durable, avec l'intention d'assurer une éducation inclusive et de qualité (Objectif 4 des Objectifs du développement durable). Ce texte présente le développement du projet TEDS et ses résultats, en réfléchissant sur des idées-clés de l'éducation à la « durabilité » (sustainability) dans des contextes européens de formation d'enseignants.

KEY WORDS. Education for Sustainability, Sustainability, Teacher, Teacher Educator.

MOTS-CLÉS. Éducation à la durabilité, durabilité, enseignant, formateur.

Introduction

The TEDS project is the result of a partnership of Higher Education Institutions from five European countries (Finland, France, Lithuania; Malta; and Portugal) which work in the field of teacher education and seek to understand how to educate teachers for sustainability. The TEDS project aims to contribute to the construction of knowledge about Education for sustainability (EduS), through the design, development, evaluation and research of teacher education programmes (TedP) and through the construction and sharing of a reference framework for contexts of teacher education. In this process, TEDS project assumes that the participation of different educational actors is essential in the promotion of sustainability.

TEDS project assumes teacher education as a central and an unfinished process in contemporary and globalized societies characterized by diversity at different levels. The main goal of the project is to equip European teachers and teacher educators with knowledge and tools to promote EduS. The project has been developed in three main phases: Phase 1 - construction of a framework for EduS and characterization of social representations (SR) of teachers and teacher educators about sustainability; this phase intended to develop knowledge, based on literature, and on educational policy documents, analysed at national and transnational levels; Phase 2 - design and implementation of TedP developed in collaboration with teachers working in schools; Phase 3 – evaluation of the results of TedP and construction of a teacher education framework for EduS.

¹ This work is financially supported by European Commission and by National Funds through FCT – Fundação para a Ciência e a Tecnologia, I.P., under the project UIDB/00194/2020 (CIDTFF).

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This text presents the development of TEDS project (products and results) with a particular focus on the analysis of the construction of the teaching professional knowledge of the Portuguese trainees attending the TedP of the Aveiro University (Portugal), in order to identify aspects that teacher education for EduS should take into account.

1. framework for education for sustainability

In phase 1 the team of TEDS project has analyzed, systematized, and organized knowledge from different fields to build a framework for EduS. The main goal of this framework was to make available and understandable key ideas for EduS allowing the design of teaching practices in different educational contexts in Europe.

The different teams worked on the identification and reading of scientific papers to construct the categories of content analysis; on the selection of the most national educational policy documents; on the discussion and definition of the categories of content analysis according to EduS; on the organization and analysis of data, with the support of webQDA software (<https://www.webqda.net/>) produced at the University of Aveiro; on the national and international discussion of the results of the data analysis; on the definition of the criteria for the selection of national dissertations and PhD thesis on EduS; on the analysis of dissertations and PhD thesis, supported by webQDA software; and on the discussion of the results of data analysis.

Finally, the different teams wrote a report about their national contexts using as categories the UNESCO education competencies for sustainability: 1) Systems-thinking competence - Understanding the articulation between different aspects of the social and natural world, recognizing the importance of analyzing the role played by people different from ourselves in society, as well as analyzing the relationships between them; 2) Anticipatory competence - Previewing consequences (positive and negative) of certain attitudes towards environment, persons or social groups in terms of understanding the role they play in the society and in the value of natural and human resources; 3) Normative competence - Analyzing present norms and values to identify their possible contribution to dialogue and social inclusion, as parts of sustainability processes; 4) Strategic competence - Learning to accept the fact that differences are important because they have positive consequences for social balance and for natural world; 5) Interpersonal competence - Individually or collectively analyzing other people or groups conceptions based on the idea of acceptance and be able to interact with them (Wiek, Withycombe & Redman, 2011; Wiek, Withycombe, Redman & Mills, 2011). This work allowed the final production of the framework, coordinated by Finnish team (Juuti et al, 2021), *Enhancing competences in Education* (https://teds.web.ua.pt/assets/relatorio_teds.pdf) presenting a summary of the situation of EduS in the educational systems of the teams of the project. As we can read,

“This work led to the construction of a framework of EduS focused on competencies to be developed in/with learners, pedagogical didactic activities to plan, implement and assess in educational contexts – which can also be considered as examples for the construction of other activities by educators and teachers adapted to the contexts in which they work – and a national and transnational curricular background in Europe. Although the contexts are very diversified and in spite of their specificity, all of them include opportunities of curricular development that try to place EduS in the centre of educational concerns, presenting this notion as a complex entity, capable of articulating among them several dimensions of knowledge and demanding comprehension, action and reflection related to modern world and possibilities of transforming it.” (Juuti et al., 2021, p. 33).

For the finalization of this framework the results of the analysis of a questionnaire answered by teachers and teacher educators in different contexts were considered. This work about social representations on EduS was perceived as very important for the development of the following activities of TEDS project, such as the design of TedP and the construction of multimodal case studies. The results about social representations about EduS seem to be aligned with the learning

objectives of this type of education for learners; seem to integrate the five key competences for sustainability; and vary according to participant's countries (see <https://teds.web.ua.pt/index.php?page=32>).

2. Design and implementation of teacher education programs

Team	TedP Thematic	Objectives
Portugal	Education for sustainability: diversity, dialogue and inclusion	To collaboratively explore the value of diversity (biological, linguistic, cultural and social), promoting its integration in the curriculum in order to educate for sustainability. To capacitate teachers to develop students' ability to find collective solutions for global and local problems with a focus on questions of dialogue and inclusion between different cultures and languages.
Malta	Education for sustainability: Environment and natural resources	To develop knowledge about the Earth, its environment, and resources to educate for sustainability. To study, preview and evaluate sustainable ways of using natural resources.
Lithuania	Education for sustainability: Responsible Use of Technologies	To capacitate teachers to be able to search for and select technologies for learning in a sustainable way. To understand benefits resulting from modern technology and problems it can generate.
France	Education for sustainability: diversity, dialogue and inclusion	To understand how future teachers will take up contemporary societal issues to implement EduS in the classroom. To contribute to the development of critical thinking on issues related to sustainability in the broadest sense (environmental, economic, social, ethical, etc.) and likely to inform eco-citizen practices.
Finland	Economic sustainability: Introduction to Circular Economy	To understand, in a collaborative way, what is meant by circular economy and how it is related to previously learned content. To understand that each choice matters, gaining capabilities to make conscious decisions and make own inventions.

Table 1. *Thematics and objectives of the different TedP*

In phase 2, TEDS team selected four main topics in order to develop TedP, coordinated by Lithuania team. These TedP are organized in different multimodal modules with the focus on different topics of EduS and adapted according to the national contexts: Environment and natural resources; Responsible use of technologies; Dialogue, diversity and social inclusion and equity; Circular economy and financial literacy. Each module was developed in the national language of the country and translated into English language. Each module contains Open Educational Resources (OERs) and includes results of action-research projects developed in schools with learners and of professional learning by the trainees (teachers-in-service or in pre-service situation). The different

TedP aimed to create opportunities to develop didactic and pedagogical knowledge about EduS, as we can see in the table 1.

The Portuguese team has conceived, implemented, and evaluated a workshop entitled “Education for sustainability: diversity, dialogue and inclusion”, which aimed to promote opportunities for the development of pedagogical and didactic knowledge about the role of diversity, intercultural dialogue and intercomprehension for the construction of more fair, cohesive and sustainable societies. It was held from March to June 2021 and was organized in eight online sessions (7 sessions lasted three hour each and 1 session lasted four hour), making a total of 50 hours, 25 hours of synchronous work and 25 hours of autonomous work. Twenty teachers - Kindergarten teachers, Primary teachers, Teachers of secondary education - working in different schools of Aveiro region participated in the workshop. Eleven teacher educators led the workshop and made it possible to create a sharing atmosphere in which they reflected and built together with the trainees their projects developed in the schools with their students, helping them to find ways to solve local and global problems concerning sustainability. The fact that the workshop was conducted by teacher educators coming from different areas of knowledge and with different experiences enriched the discussions and also enabled a diverse methodology to learn the content presented. In some sessions, teacher educators invited other researchers from other domains working on sustainability to contribute with their expertise to the discussion about EduS.

The content presented in all sessions had as main base the sustainability competences of UNESCO and the workshop was implemented, in all the sessions by zoom and privileged the following methodology:

- Characterization of the working group (representations on EduS, motivations and expectations) and definition of a joint work plan.
- Presentation of the main objectives and purposes of the workshop taking TEDS project as base.
- Reflection on theories and practices about EduS presented by teacher educators and trainees to be implemented in schools.
- Construction of educational projects to be developed in the schools by groups of trainees.
- Presentation by groups of trainees of the projects implemented in the schools.
- Evaluation of the workshop considering the main learnings on EduS.

The intention was to make teachers able to understand, reflect and work on many different subjects concerning EduS and their main challenges, namely, privileges, prejudices, cultural and linguistic diversity, inclusion, natural resources and so many others (Zeichner, 2009).

For evaluating teaching professional learning, teacher educators considered five aspects: fieldwork; narrative PowerPoint presentations; projects design and development; group reports of the projects implementation; and individual written reflections.

In phase 3, the members of the Portuguese team analyzed the results of TedP focusing on the teachers' professional learning on EduS in order to design and develop multimodal case studies in teacher education.

3. Results from Portuguese TedP and multimodal case study

The construction of multimodal case studies must show characteristics and dimensions of teacher education programs in order to be useful tools in and for teacher education for EduS. The multimodal case study is conceived as the process(es) of teacher(s) development on EduS, and the reasons that enhance and constrain it showed with the help of different media (texts, images, schema, videos, ...).

The Portuguese team collected data from two questionnaires answered by trainees and teacher educators about their social representations about sustainability and EduS; individual written reflections about the professional learning experience of the TedP; action-research projects developed in schools; presentations of the project by trainees in narrated PowerPoint format; group reports of the work done by trainees; and other material related to the EduS projects. The team analysed the content of the documents produced by the trainees (using the competencies of EduS) and the level of reflection they revealed: from a more routine and technical reflection to a more critical, dialogic and transforming discourse of reflection (Ward & McCotter, 2004).

The analysis of all these documents, complemented by interviews with 4 voluntary teachers who participated in the TedP, allowed the construction of multimodal case studies (presented in videos of 15 or 20 minutes) in which each teacher reflects on the positive and negative aspects of the TedP, highlighting the learning achieved on EduS and the perceived professional development, as well as gave suggestions for future teacher education programs on education for EduS.

3.1. Analysis of the questionnaires of TedP

In order to understand the effects of TedP on the (re)construction of the concept of “sustainability” and on how EduS can be implemented in the educational context, the Portuguese team analyzed the answers of the two questionnaires.

The first questionnaire was answered by sixteen from twenty trainees and the second one by all the twenty participants of the TedP. In the first questionnaire being asked to write the first four words that came spontaneously to their mind concerning the terms “Education for sustainability” and to the term “Sustainability”, trainees mentioned many words related to those concepts. Then, from a total of 64 indications for “Education for Sustainability”, 7 words had between 3 and 5 indications, making a total of 26 indications; and from a total of 64 indications for “Sustainability”, 6 words had between 3 and 6 indications, making a total of 21 indications as we can see in figure 1 and figure 2 below:

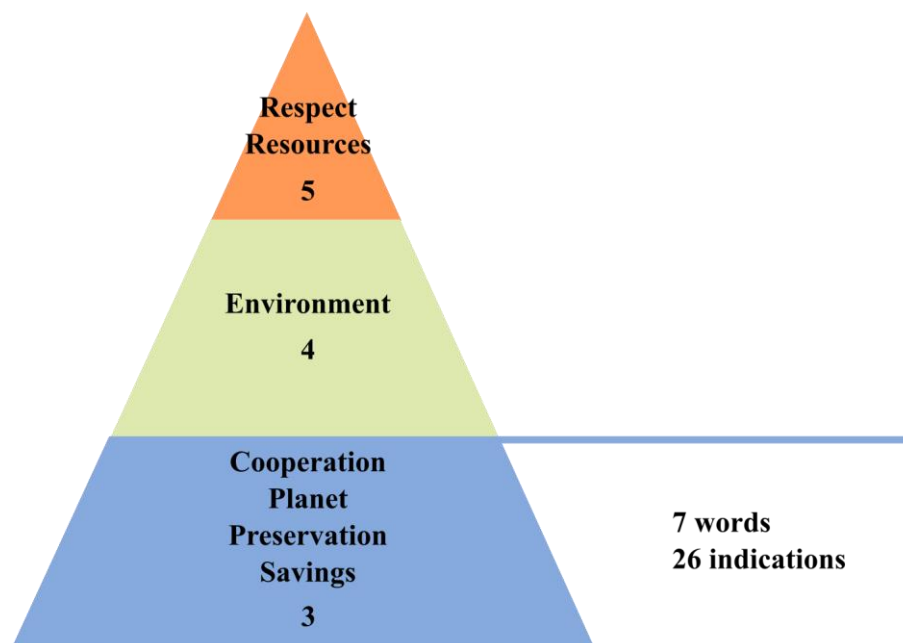


Figure 1. Words related with EduS in the 1st questionnaire

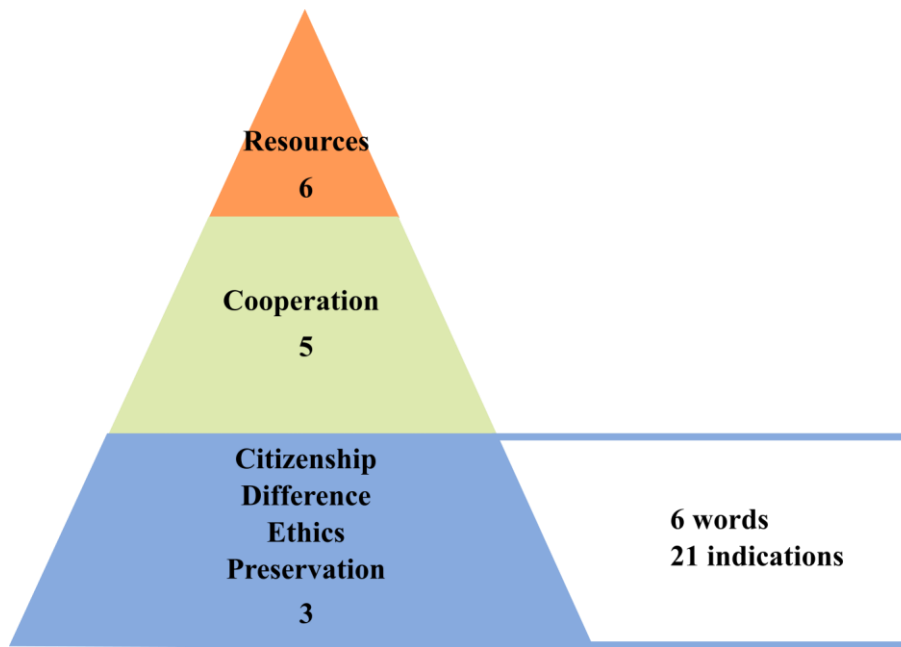


Figure 2. Words related with sustainability in the 1st questionnaire

In the second questionnaire, considering the same questions from eighty indications they answered as the most cited words for:

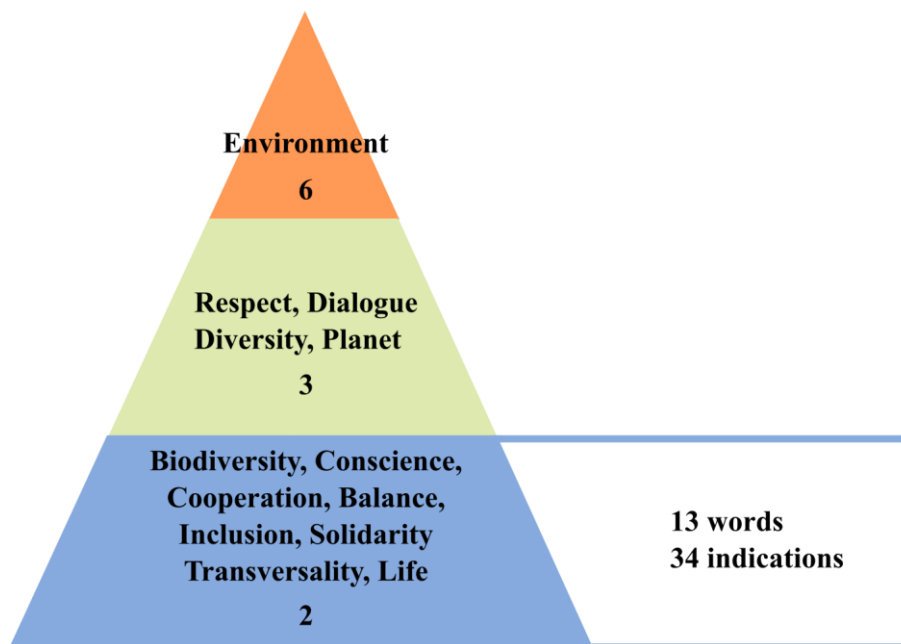


Figure 3. Words related with EduS in the 2nd questionnaire

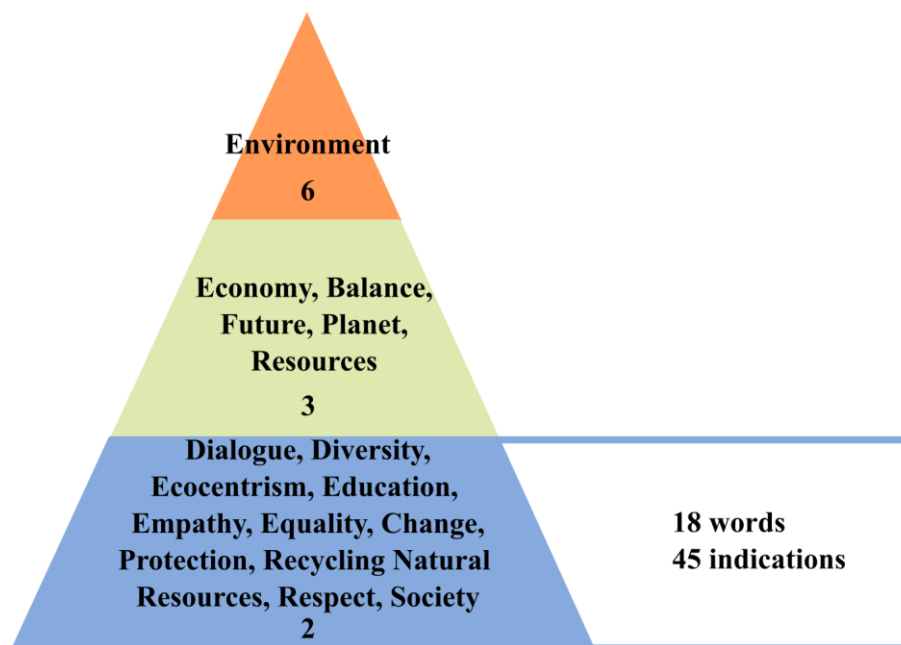


Figure 4. Words related with sustainability in the 2nd questionnaire

Comparing the indications about the first four words that came spontaneously to their mind concerning the terms “Education for sustainability” and also to the term “Sustainability”, we find out that some words were repeated for both terms, such as, in the first questionnaire 3 words, *resources* (10), *cooperation* (7) and *preservation* (6); and in the second one, there were 6 words associated with both terms: *environment* (12), *planet* (6), *balance* (5), *diversity* (5), *respect* (5) and *dialogue* (5). The participants in the TedP expanded in a clear way their ideas about EduS and “sustainability”, showing that they understand, in the end of the TedP, this type of Education as more complex, more holistic, covering several areas of intervention, as well as several objects of knowledge and teaching. In this sense, we can say that the trainees who participated in the TedP developed by the Portuguese team have extended their knowledge about the world, the concept of sustainability as well as the possibilities of educating their students for sustainability.

The second questionnaire was also focused in positive and negative aspects of the TedP. Regarding the positive aspects for their teaching professional development, they pointed out that the program contributed for the update of the sustainability concept and value, and to the importance of the related competencies of acting for sustainability, as well as for the enrichment of their pedagogical didactic knowledge, motivating to change their teaching practice, to use different strategies and resources, to share reflections and learning experiences. Thus, one of the participants said that the TedP allowed to: *A more comprehensive look at sustainability. A change in my personal habits/behaviors. Due to what I was learning and applying in the classroom, I felt more motivated to make things different.* (Carolina).

The trainees also considered as positive aspects: the organization of the sessions, the selection of the topics developed, the content of the presentations, the quality and the diversity of resources shared, the methodology used by teacher educators, the communicative and academic competences of teacher educators, and the interaction between all the participants. One of the trainees said: *The training methodology and the activities carried out were very diversified and enriching with a balance between theory and practice. The existence of time to discuss/intervene, to ask questions or participated in the suggestions presented, which ended up changing into adapted suggestions to be put into practice with our students. The trainers’ way of sharing their knowledge contributed to create an environment of well-being* (Sara).

Considering the negative aspects, Portuguese trainees indicated: the lack of time to go deeper on the understanding of the content and concepts presented and to share them with their students ; the

short time to plan and develop the project in the schools ; the development of all sessions through zoom online platform ; the difficulty to conciliate their own work in the schools and the time to develop the tasks with the colleagues participating in the TedP. Two trainees wrote : [it is difficult] to *reconcile the classes with the planning of the group work. Lack of technological resources at my school* (Rita); [I didn't appreciate] *the online way the training was developed. Little time to develop the project* (Joana).

In the final part of the second questionnaire, there was a question in which the trainees were asked to give suggestions to improve other programs about EduS for in-service teacher education. They indicated many topics related to EduS (circular economy, fair trade, environment and natural resources, social sustainability) and also suggested that the TedP would be better if they had more time available to deepen the topics approached and to analyze or create some problem situations on EduS to reflect and propose solutions by trainees supported by teacher educators.

The results of the TedP development draw our attention to the multi-faceted and complex nature of teachers' responses to EduS and to different possibilities of teacher education in this domain, namely: time for information, reflection, and action, interdisciplinary work, dialogue between different educational actors and articulation of theory and practice, without forgetting the different dimensions of education for sustainability.

As a synthesis, we can say that this analysis allows the identification and understanding of relevant aspects of teacher education for EduS, aspects that were useful in the construction of multimodal case studies to explore in other teacher education situations.

3.2. Teacher Education: reflections and learnings from a case

The aim of TEDS project is to make available multimodal case studies about teacher education programs for EduS. The main impact of these multimodal case studies relates to their potential as a study basis for future teacher education situations, allowing transferability to other educational contexts (Wolfensberger, Piniel, Canella & Kyburz-Graber, 2010).

The analysis of the results of the Portuguese TedP shows that trainees pointed out mainly that the workshop contributed for the update of the sustainability concept and value, as well as for the understanding of educational competencies related to EduS. In the speech of the trainees, the TedP has enriched their teaching professional knowledge, has motivated them to change their teaching practices, using different strategies and resources. But beyond these general and transversal aspects, it is important to go deeper in order to understand the process of teacher professional development that occurred with the participation in TEDS' programme. In this sense, it is important to mobilize data presented in the case studies.

The first case was performed by a secondary English teacher with more than 30 years of teaching experience, who is a communicative, enthusiastic and dynamic person. With her colleague of the group work in the TedP, she developed a project with the title of *The Forest: What should we know to VALUE, PRESERVE, and CARE for it?* in a school of the central region of Portugal with 15 years old students (final year of Basic Education).

The case, Clarisse, shows a great capacity of reflection, indicating that she was able to attend the transformative dimension of education. She emphasizes the role of the collaboration processes with other colleagues from different areas of knowledge (she worked with a teacher of History), as well as with teacher educators and different people of the community. In the intervention project, she worked with the students about the forest and its preservation, but through intergenerational dialogue.

Clarisse emphasizes the need of cyclical teacher education processes, namely for the understanding in an expanded and recursive way of the concept of sustainability and of the possibilities of EduS. This idea was also emergent from the analysis of questionnaires answers,

showing the need to consider interdisciplinary teams of teacher educators and to allow more time to create conditions for the integration of new knowledge in the pedagogical repertoire of the teachers and teacher educators.

Final reflection

The results of this first analysis allow to say that the objectives of the TedP were achieved, even in a partial way. Trainees explored collaboratively the value of diversity (biological, linguistic, cultural, social) in EduS and were able to integrate this idea in the curriculum. However, we must wait for the analysis of all data to be sure what are the points teacher educators need to consider in new ways in future TedP. In other words, we must wait for the discussion between the teams in order to confront results from the TedP with different focus (social, cultural, linguistic, economic and environmental points of view) (Bamber, 2019). It is necessary that schools are engaged in this process of EduS, developing competencies that will prepare teachers and learners to be actively committed citizens in the construction of more sustainable societies, what can be done by inter and transdisciplinary programs. These programs demand understanding, engagement and responsibility from all the teachers in one particular school but also in different schools with the collaboration of teacher educators from different domains of knowledge, creating a truly holistic Teacher Education Network in and towards education for sustainability.

To conclude this reflection, it is important to consider one of the goals of TEDS project which was to create opportunities to build knowledge about EduS in a collaborative way. This objective was achieved because teachers and teacher educators participated in the whole process, sharing their expertise and experience in the educational field with the intention to contribute to the expansion of educational knowledge in the domain of sustainability. Even though there are many challenges to be faced in what concerns EduS, especially considering government and educational policies, this TedP can be taken as a real contribution.

Réponse à Ana Andrade et mise en perspective

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S'intéresser aux dimensions éducative, pédagogique et didactique de l'éducation au développement durable (EDD) invite à mettre en perspective la formation des intervenants scolaires de l'EDD⁴ autour de quelques questions que se posent inévitablement les formateurs. On pointe ainsi dans les lignes suivantes ce qui nous semble constituer trois terrains d'investigations incontournables pour ce type de formation. Ces questionnements ont traversé le projet TEDS auquel l'article d'Ana Andrade fait référence dans ce numéro. Le premier d'entre eux, renvoie à ce qu'il faut-il étudier et apprendre en EDD. Il interroge la sélection et la fonctionnalité des objets d'étude et des contenus auxquels l'« EDD » fait ou peut faire référence. En lien avec ces premières interrogations, un second champ de questionnement porte sur l'activité professionnelle inhérente à la mise au travail de ces objets d'étude spécifiques avec les élèves. Il appelle à examiner les difficultés auxquelles doivent faire face les professionnels confrontés aux démarches de l'éducation au développement durable, mais également aux avancées et aux transformations professionnelles que suppose leur dépassement. Enfin, un troisième volet questionne plus particulièrement les démarches de formation et les dynamiques possibles qu'elles sont susceptibles de générer pour aider les enseignants.

⁴ En France, les enseignants et les conseillers principaux d'éducation sont les plus concernés par l'EDD.

Penser les objets d'étude de « l'éducation au développement durable » ?

Depuis les années 1990, les besoins d'apprentissage évoluent, l'éducation vise à préparer les individus aux défis du monde contemporain et aux grands enjeux de la société (employabilité, environnement, santé, citoyenneté, sécurité alimentaire) que définissent des institutions internationales telles l'ONU ou l'OMS (Barthes & Lange, 2017). L'EDD s'inscrit dans ce mouvement. Elle constitue en cela un objet d'éducatif récent qui s'impose progressivement dans les différents systèmes scolaires européens. Comme tout enseignement ou démarches éducatives l'EDD pense ses contenus en référence à des savoirs ou des pratiques. C'est à partir des « pratiques sociales de durabilité » qu'elle procède à des découpages et des mises en forme pour les rendre accessibles aux élèves. Elle organise la sélection de ce qu'ils doivent s'approprier, la manière de le transmettre et de le distribuer dans le temps. Mais les objets d'étude liés à l'EDD décalent l'intervention enseignante des problématiques didactiques disciplinaires habituelles et ce faisant elles interrogent la formation des enseignants et des CPE à nouveau frais. D'une part, les savoirs qui faisaient l'objet des apprentissages et du développement deviennent d'éventuels moyens de la construction de compétences. Moins centraux, ils sont pensés pour apporter un éclairage particulier. D'autre part, ces approches nouvelles considèrent la question des valeurs et de l'engagement comme déterminante. La dimension politique de ces registres n'est d'ailleurs pas sans mettre bien souvent l'intervention éducative dans l'embarras par la tension qu'elle génère entre travail des valeurs et devoir de neutralité. Ces évolutions et ces contraintes font des questions curriculaires une préoccupation majeure. Elles posent à l'intervention éducative et en rebond à la formation des enseignants la question de la structuration de contenus qui ouvre les élèves à une pensée critique et problématique. Quels sont ou peuvent être ces nouveaux objets d'étude, quelles sont les tensions et les contradictions qui les travaillent, quelles sont les faits qu'ils examinent, les conditions qui permettent de les penser ? Les approches et les réponses à ces premières questions varient dans des structurations diverses : problèmes complexes, questions socialement vives, compétences onusiennes ... Le projet TEDS s'est inévitablement emparé de cette réflexion en positionnant un colloque sur le curriculum en point d'orgue de ces actions.

Penser les progrès, les transformations et les difficultés professionnelles liés à l'éducation au développement durable ?

Ces nouveaux objets d'étude au croisement de savoirs, de démarches disciplinaires différentes, de postures, d'engagement modifient la façon dont les intervenants scolaires de l'EDD peuvent aider les élèves. Le projet de permettre l'accès à de nouvelles manières de parler, de penser et d'agir la vie en anthropocène et les problèmes qui s'y associent participent pour certains (Lange et Barthes, 2021) de la construction d'une nouvelle forme scolaire. On pense par exemple ici à des dispositifs d'enquête ou de débats liés au travail sur les problèmes flous ou les questions socialement vives (QSV) (Chauvigné et Fabre, 2021). L'absence de solution qui les caractérise contraint les enseignants à repenser différemment l'activité d'apprentissage des élèves. Les modalités habituelles d'enseignement mobilisant la transmission sont remises en cause au profit de démarches d'étude et d'exploration des possibles. De nouveaux procédés d'accompagnement invitent à travailler davantage sur le questionnement des problèmes plutôt que sur l'apport de solution.

Se poser la question de la formation professionnelle des intervenants scolaires à l'éducation au développement durable interroge inévitablement sur la manière dont ce domaine particulier de la professionnalité peut se construire. Comment progresse-t-on professionnellement dans cette activité éducative originale ? Quels sont les problèmes que pose la construction de ses nouvelles démarches aux enseignants débutants ou chevronnés ? Quels sont les indices qu'ils doivent construire sur l'activité des élèves et qu'ils ne prennent pas en compte dans leurs interventions didactiques ou pédagogiques usuelles ? Quels sont les difficultés récurrentes, les modes de fonctionnements usuels, les « organisateurs » spontanés des pratiques qui peuvent faire obstacle à la construction d'un regard nouveau sur les progrès des élèves, leurs postures, leurs valeurs et au renouvellement des démarches éducatives, pédagogiques ou didactiques ?

Penser les scénarios de formation dans une visée pragmatique et transformative ?

La promotion de l'EDD et ses enjeux dans le système scolaire poussent les équipes enseignantes et éducatives à la réflexion et à l'innovation. Son introduction assez récente crée un contexte à la fois contraignant et inventif pour les praticiens et la recherche en éducation. Nous avons signalé quelques-uns des traits les plus saillants de cet espace de contraintes et de ressources dans lequel les acteurs doivent apprendre à se repérer. Dans ce contexte de changement et d'incertitude et même s'il existe des points d'appui pour agir, la formation ne peut se contenter de transmettre des scénarios ou des démarches ad hoc. L'injonction ou la présentation de solutions d'intervention éducatives ou didactiques sont impossibles. Comme y invite M Fabre (2011), avancer dans un monde problématique passe par reconstruire des cadres et problématiser. C'est dans cette logique que le projet TEDS a développé sa réflexion sur la formation des enseignants. Il a poursuivi l'intention d'aider les acteurs à agir et se situer autour de deux visées conjointes 1) produire des scénarios éducatifs qui permettent efficacement aux élèves d'appréhender les problématiques de vie en anthropocène 2) permettre aux intervenants d'examiner de manière critique les conditions de fonctionnement des procédés éducatifs, pédagogiques ou didactiques qu'ils développent. Ces visées qui mobilisent des dimensions pragmatiques, critiques et compréhensives sont mises au travail sur le terrain dans des démarches de type recherche-action. Celles-ci cherchent à produire, dans des logiques d'enquête (Dewey, 1939), des savoirs à la fois intelligibles et applicables. Elles permettent aussi de mettre à jour les conditions de la transformation des pratiques et des acteurs.

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