Thematic Article

Which ways of evaluation of education for sustainability is acceptable for Hungarian teachers?

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Abstract

By what criteria and how can the efficiency of education for sustainable development (ESD) be assessed or measured? Theoretical and political definitions of teacher competencies for ESD are only the first steps in the implementation process of these competencies throughout the educational system. If we want to develop an effective evaluation system of ESD, a diagnosis is needed about which ways of evaluation are accepted by teachers and which competencies needed further developments. Our research has been conducted to map teachers' views about the possible ways to evaluate ESD. An online questionnaire was used to gain data about teachers' view on different types of ESD evaluation. On the basis of the results, a three-level ESD evaluation system seems generally and professionally appropriate: (a) introducing ESD competencies in the mainstream teacher evaluation processes, (b) initiating awards and other appraisal system for innovative ESD teachers and schools, and (c) periodic external assessment of pupils' and teachers' preparedness of sustainability-related issues.

Keywords: sustainability education, teacher competencies, internal evaluation, external evaluation, whole-school approach

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Introduction

A growing amount of evidence indicate that without significant changes in the operation of societies, human activity on the Earth cannot be sustained without global disasters in the long run. However, evidence itself is not enough even to initiate social changes, not to mention the realization of changes. It is more and more obvious that scientific knowledge alone is insufficient for responding sustainability challenges societies dealing with. There are two big steps from evidence to social changes at least. First, evidences have to be communicated to society. Second, new ways of operating the society as well as encouraging and ensuring sustainable lifestyles should be developed and introduced. Education has crucial role in both steps. This is reflected in the Sustainable Development Goals (SDGs) adopted within the Agenda 2030 by the United Nations (UN, 2015) where, as Mika and Kiss have stated, in addition to SDG 4, which is entirely about education, six additional SDGs refer to education or its synonyms (Mika & Kiss, 2018).

Many authors and organizations indicated that education is paramount for the achievement of all SDGs (e.g., UNESCO, 2017). Education for sustainable development (ESD) can contribute to achieving the SDGs by, first, developing cross-cutting sustainability competencies needed to face the many different sustainability challenges and to relate the different SDGs to each other. Second, ESD can provide specific cognitive, socioemotional, and behavioral learning outcomes that enable learners to deal with the particular challenges of each SDG. We understand education not merely as instruction, but rather as a process of involvement in the process of future orientation, future planning, and creation of a sustainable future (Mathar, 2013).

A lot of theoretical work (e.g., Néder, Saly, & Szentpétery, 2014; Sterling, Glasser, & Rieckmann, 2017; Wheeler, 2000) have been carried out in the new millennium to identify teachers' competencies and school-operating processes, which are needed to communicate the messages of sustainability to learners and prepare them to take an active part in the sustainable transition of the society. One of the most influential models was developed in the international collaboration of several teacher-training institutes and other stakeholders in the Curriculum, Sustainable development, Competences, Teacher training (CSCT) project. The main output of the CSCT project was a conceptual framework for ESD and a handbook, containing competences and contents for a curriculum for ESD (Sleurs, 2008). Beside the theoretical developments, international educational policymakers also recognized the need for teacher competency definitions related to ESD, and in 2012, the United Nations Economic Commission for Europe (UNECE) defined a set of ESD teacher competencies (UNECE, 2012). On the basis of this political development, educators started to operationalize the competency models by identifying detailed learning outcomes, which give a detailed description of the expected result of the educational process for ESD competencies (Rounder Sense of Purpose, 2018).

We should however reflect on the fact that in spite of the aforementioned theoretical, political, and implementation efforts, a recent literature review of 60 articles about ESD competences found that it is so hard to describe the complexity of ESD that "*the literature is still dominated by 'laundry lists' of competencies rather than conceptually embedded sets of interlinked competencies. But even often under different names there is a consensus about the main domains of ESD competences*" (Sterling, Glasser, & Rieckmann, 2017). On the basis of the most distinct teacher competencies for sustainability (interdisciplinarity, critical thinking, global understanding, dealing with locally relevant issues, supporting social decision-making, supporting learning by doing, and teaching about adaptation possibilities for environmental challenges), we pointed out that Hungarian eco-school teachers see some of them as non-important, very difficult to realize, or even non-existing (Könczey & Varga, 2017). These results demonstrated that there is a significant need to develop ESD competencies of Hungarian teachers.

For any developmental process of teachers' ESD competencies or schools' sustainability education practice, the development could start on the basis of a diagnosis gained from an evaluation process. Therefore, in this study, we try to map which methods of evaluation of ESD are accepted by teachers in Hungary and so could be easily implemented, and which are rejected by them and so their implementation needs a special attention. This information could help the development and implementation of a nationwide ESD evaluation system.

Our evaluation approach is based on Mayer and Mogensen's sociocritical and Patton's developmental evaluation paradigms. The sociocritical paradigm considers the evaluation process as a discussion between the evaluators and the subject of the evaluation. The aim of the evaluation in this paradigm is to continuously and cooperatively improve the educational practice (Mayer & Mogensen, 2005). The concept of developmental evaluation emphasizes that the systems and processes of any social sector has to change because of the changing of the society. Therefore, evaluation processes should not simply judge the actors, systems, and processes of the society, but through a continuous feedback mechanism supporting the continuous social innovation (Patton, 2011). Evaluation plays an enormous role in the teaching-learning process. It helps teachers and learners to improve the process and outcomes of teaching and learning. Evaluation is a continuous process and a regular exercise in school life. Besides the presumable improvement in teaching and operation, it provides a kind of accountability to the society, parents, and to the education system. Although these statements are evident, there is a lack of systematic evaluation of ESD work of the Hungarian teachers and schools.

Another argument for the development of the evaluation system of ESD is that the current educational systems are reproducing the current, unsustainable economic, and social processes. A new, more sustainable model of the society requires new types of

educational approaches; otherwise, stakeholders of schools cannot contribute to the necessary economic and social changes.

Beside evaluation is a starting point of any development process, evaluating teaching and learning gives opportunity for recognizing and rewarding effective teaching, as well as systemic and resilient learning innovations. If well designed, teacher appraisal and feedback systems can be used as a tool to increase teacher effectiveness and achieve better student learning outcomes. Evaluation can help to increase the focus on teaching and teachers' professional learning (OECD, 2013). This study reveals educators' opinion of evaluation methods aiming at education for sustainability.

Methods

Hungarian teachers' and schools' ESD-related thinking is regularly studied in different researches by the Hungarian Institute for Educational Research and Development. This paper gives an overview of some results of a research considering teachers' view of ESD. As the whole-school approach is the recognized best practice in ESD (see, e.g., Mathar, 2013), we have sought acceptable ways of evaluating ESD among schools that apply this approach, i.e., eco-schools. In Hungary, a quarter of all schools are eco-schools.

The data collection was conducted in January–February 2019 as an online questionnaire for Hungarian eco-schools. This paper is focusing on the part of questionnaire dealing with the possible methods of evaluation of ESD, namely the results collected by the following main question: *What do you think, what kind of method has to be applied to evaluate schools ESD practice? (Please decide for all methods if it is applicable or not applicable for evaluation. In the textbox below, you could also provide your own suggestion and arguments.)*

The questionnaire offered several educational evaluation opportunities and free cells for answering the question on three levels: school level, teacher level, and student level.

The options offered are shown in Table 2, but it is important that schools were able to respond free text to each level of assessment. A total of 1,005 questionnaires were sent to which 742 answers received. Table 1 shows the descriptive data of the participating schools (Table 1).

Answers of schools with less than half student population than their capacity (less than 50% occupancy, $n = 65$) were omitted from further analyses because their respondents were extremely rarely consider any kind of assessment as "applicable" probably due to the extreme existential threats caused by the missing student population; therefore, data of 677 schools were involved in the further analysis.

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Table 1. Descriptive data of schools answering the ESD evaluation questions in February, 2019, Hungary (n = 742)

Variable	Distribution
School size category	
Occupancy (percent of the capacity of the school filled by pupils)	Except otherwise stated, data of schools with occupancy below 50% are omitted from the following data and analysis from this point
Duration of whole-school ESD practice (eco-school age)	Average = 7.17 years SD = 4.52 Minimum = 1, maximum = 14 years
Respondent's experience in the school	9 years or less: 24% 10–24 years: 34% 25 years or more: 32% No answer: 10%
Respondent function	Leader, principal, vice principal: 28% ESD group leader: 29% Other teacher: 25% Non-teacher staff: 1% No answer: 17%
The respondent is a leader or there is a leader among the contributors	"No": 46%; "Yes": 54%
School type (a school can serve several levels)	Primary: 79.5% Secondary: 24.5% (within this, grammar school: 12.6%, vocational grammar school: 14.6%, vocational school: 4.0%) Dormitory: 9.9% Special needs education: 5.0%
Owner of the school	State (educational authority): 90% Church: 7% University: 2% Others: below 1%

Data were requested as to who was involved in the formulation of the responses (respondent support). On average, 10 people assisted in the responses with a high standard deviation. About 30.1% of the respondents worked alone. In the remaining cases, the following main groups were involved: teacher: 77%; leader: 43%; non-teacher staff: 32%; eco-school team: 23%; pupil: 28%; parent: 17%; teacher supporting student council: 13%; external assistant: 4%. Fifty-four percent of the answers were given by or with the involvement of a leader.

Results

Accepted and non-accepted evaluation methods

The evaluation methods offered in the questionnaire are displayed in Table 2. The following options are accepted by the majority of the respondents: document-based evaluation (e.g., evaluation the pedagogical program or code of rules of the school), evaluation of the visual appearance or decoration of the school (green image), teachers' engagement, intensity of learners' engagement, and the existing internal self-evaluation systems. The following opportunities are not accepted (considered as non-applicable) by the majority of the respondents: evaluation by carbon and water footprint of the school, assessment solely on the base of evaluating managerial work.

Examined by factor analysis, we found autocorrelation of some aspects and that there are aspects that explain the variance of the generated factors only to a negligible extent. As a result, some aspects (1a, 1b, 1c, 1f, 2b, 3b – Table 2) are omitted from the further analysis.

To explore the pattern of respondents' thinking on ESD evaluation methods, we grouped cases by a set of multiple cluster analysis using answers as dummy variables and examined the characteristics of the created groups. Gradually leaving out items that have little effect on the differences in responses, some groups have become visible. Respondents are clearly divided into two different groups, depending on whether or not they accept external evaluation of teacher (2d – Table 2) and external evaluation of students (3c – Table 2) as an applicable method for evaluation of the quality of ESD work in the school. The other evaluation criteria offered have a decreasing grouping power in the following order: 2a and 1h; then 1e, 1g, and 1j; and then 2c, 1d, 1i, and 3a.

The two clusters are called (a) External Evaluation group (EE; n = 288) and the only (b) Internal Evaluation group (IE; n = 283). There is a clear difference between groups EE and IE in terms of assessment, at least when it comes to external measurement. Among the schools belonging to the group IE, even the item 2a – an obligatory, but locally managed internal teacher evaluation system – is less accepted than in IA group (χ^2 = 11.558, df = 1, p = .001). The group EE is not only characterized by more positive responses to item 2a,

Table 2. Suitability of each potential evaluation criterion according to responding schools

Level	Potential evaluation criterion		Frequency of "aspect is suitable" in answers (%) ($n = 543$, incomplete records omitted)
School evaluation	1a. Analysis of the school pedagogical program if its vision clearly includes ESD at least for 3 years		82
	1b. Analysis of the code of rules of the school: if it includes environmental rules for all stakeholders of the schools		88
	1c. Measurement of the school's carbon footprint		33
	1d. Measurement of the school's water consumption		45
	1e. Measurement of the school's ecological footprint		58
	1f. Assessment of school's visual appearance (decoration, homepage, etc.)		93
	1g. Self-evaluation by an ESD school score system		63
	1h. Annual QA measurement of stakeholders		59
	1i. Exclusively by the evaluation of the principal		13
	1j. By the point achieved by the school in the eco-school application		56
	Other	Within the 121 coded responses, more than third offers self-evaluation and using data about involvement in ESD activities One tenth about internal measurement	
Teachers' evaluation	2a. Using and modifying of the existing internal and obligatory evaluation system of teachers		42
	2b. Evaluating teachers' participation in the work of the ESD or eco-school working group of the school.		87
	2c. Evaluating teachers' participation in ESD in-service training courses.		49
	2d. National teachers' test		50
	Other	More than third of the coded 132 free text responses deals with self-evaluation and data about involvement in ESD activities. One tenth about internal and external measurement	
Learners' evaluation	3a. A textual assessment of pupils preparation for, and participation (attitude) in sustainability tasks in accordance with the school's policies, program, and work plan		61
	3b. Diversity of engagement in sustainability related assignments (e.g., active in at least three different assignments)		81
	3c. National pupil competence test (e.g., by modification of existing tests by including ESD aspects)		50
	Other	More than third of the coded 123 responses mentions pupils engagement (reach and activity). More than one tenth of responded mentioned two other aspects: by rewarding outstanding performance (i.e., with a preliminary unspecified set of criteria) and internal measurement as assessment	

but has also been not so refusing to schools' water footprint and ecological footprint (1d, $\chi^2 = 13,921$, $df = 1$, $p < .000$; 1e, $\chi^2 = 7.104$, $df = 1$, $p = .008$) and more accepting to regular institutional quality assessment (1h, $\chi^2 = 15.512$, $df = 1$, $p < .000$) as part of a future ESD evaluation.

Secondary schools together ($\chi^2 = 3.994$, $df = 1$, $p = .046$), and especially grammar schools were more likely to belong to group EE ($\chi^2 = 41.675$, $df = 1$, $p = .031$) than group IE. Concerning the owner of schools, all five private schools and the majority of church schools were found in group EE ($\chi^2 = 12.519$, $df = 9$, $p = .181$).

Of the strongest clustering factors (2d and 3c), item 3c is more important. This is indicated by the much larger difference between criteria 2d (national ESD teacher test) and 3c (national pupil competence test) when the answers of middle- (occupation rate between 0.5 and 0.75) and high-saturated (occupation rate above 0.75) schools clustered together, compared to the difference in the relevances of criteria we have got when clustering the answers of only high-saturated schools. In other words, within middle-saturated schools, the dissection between schools accepting or rejecting external student ESD testing is not so definitive than between schools accepting or rejecting external teacher ESD evaluation. This result suggests that student external test is seemed as the least easy-to-accept way of ESD evaluation, which could be accepted by schools if they face no existential threats at all.

No other significant differences were found within the background variables; thus, we can state that evaluating ESD with external evaluation methods is acceptable about half of the sample, with the exceptional positive attitude of grammar schools toward external testing; meanwhile, the response to external measurement of pupils is strictly controlled by the threatening emptiness of the school. Otherwise, the response to any external ESD measurement may depend on organizational culture of the school.

Free text answers

The free text answers, which were provided by 132 respondents about their views on ESD evaluation, were grouped according to their main messages. Interestingly, a significant group of respondents, more than 10% of those who gave free text answers, expresses the opinion that ESD is not worth to measure, because measuring itself reduces the efficiency (time and commitment) of teachers, especially if there is no any further consequence of assessment. The following statement is illustrating the viewpoint of this group:

> "*In our opinion, the whole evaluation system is formal, . . . and inadequate to achieve these goals.*" . . . "*Teacher evaluation is just a storefront. Anyone who wants can do it*

> *anyway"* ... *"We should reduce the burden on teachers, they would do better on sustainability!"*

Other answers indicate assessment as something very difficult to standardize, to make it comparable, considering especially institutions for special needs, but the simple rural–urban situation also means significant differences in school opportunities. This group often considers evaluation as an external pressure for environmental awareness as illustrated in the following quote:

> *There are too many reviews lately and from too many sides. It is becoming counter-productive. Environmental awareness is an individual decision for everyone. You can convince, enlighten, but not worth commanding.*

The free text answers could be categorized according to the clusters presented above. We present some interesting or characterizing sentences for both groups EE and IE of those who accept the need for ESD evaluation with external measurement (group EE) and those who accept ESD evaluation without external measurement (group IE).

Internal Evaluation group. *"We would include an indicator fit to the local context (geographical and social contexts) measuring the extent to which the school contributes to the sustainability of the settlement."*

[By] *"the environmentally conscious behaviour of his/her class."*

[Could be appropriate] *"Defining tasks by student group based on age level, which could be linked to a possible scoring system. Develop a task bank for student groups, adopt it at class level [and then periodically evaluate it"*

External Evaluation group. *"Individual textual evaluation makes no sense if there is no parental or institutional expectation or obligation behind it* ... *"* therefore: *"nationwide targeted measurement is appropriate."*

"A competency and indicator system related to environmental protection and sustainable development should be integrated into the teacher portfolio and the teacher competencies. School inspectorates should pay more attention to school environmental education!"

Conclusions

The results presented in this study have revealed that teachers and schools have very complex and diverse opinions on how ESD could be evaluated. An interesting finding is that the diversity of these opinions could be explained to a great extent by the characteristics of the schools. For example, schools having significantly fewer pupils than their capacity and so facing existential threat of closing are overwhelmingly negative – about any kind of evaluation of ESD. Existentially slightly threatened schools accept the external evaluation of

teachers more than the external evaluation of students. Secondary schools and especially secondary grammar schools are more open for evaluation by external evaluators probably because of the usual external evaluation features like students' final exams at the end of their grammar school. Grammar schools are more used to external evaluation methods, which are much more less present in primary schools.

The samples were divided into two groups by their opinion about internal and external evaluation methods. This result is specially important taking into account the fact that, since 2013, a competence-based evaluation qualification system of teachers has been operating in Hungary, which is a basis for teacher's career promotion having a significant effect on teachers' salaries too (Symeonidis, 2019). The 9 professional teacher competencies[3] are assessed by the curriculum supervisors on the basis of 66 indicators, including classroom observation as well, but based mainly on the teacher's portfolio of her/his own documents and teaching reflections. Every 5 years, teachers' work is evaluated by external experts contracted by a central Inspectorate. Evaluators use a set of 66 indicators of the 9 general teacher competences. ESD competence has been introduced as a new competence to this competence list recently, so from 2020 teachers' ESD competences will be evaluated within this system.

It should be noted that one significant group of respondents prefers an evaluation system where an internal self-evaluation system operated by the schools is combined with external evaluation methods (e.g., attitude and knowledge measurement of pupils, parent questionnaires, and national testing). As this combination eventually describes well the teacher evaluation system recently operating in Hungary, this result indicates that the introduction of the new ESD competence into the recent system probably will be well received by a significant group of teachers.

On the other hand, as there is also a significant group of school refusing any kind of ESD evaluation, and other group resisting external evaluation of ESD, a serious preparation process is required to prevent the negative consequences of the foreseeable resistance to evaluating ESD competences of these schools and teachers. Frustration of stakeholders, decreasing trust in the operating teacher evaluation system, increasing the number of

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[3] The nine teacher competences in Hungary: (a) science, subject, and curriculum knowledge; (b) planning of pedagogical processes; (c) support for learning; (d) development of the learner's personality, individual treatment, and appropriate methodological skills; (e) supporting different sociocultural aspects of student groups and communities; (f) continuous evaluation and assessment of pedagogical processes and students' development; (g) (NEW COMPETENCE, since 2019) skills in environmental education, reliable representation of the values of sustainability, and the way of communicating sound environmental attitudes; (h) communication and professional cooperation as well as, problem solving; and (i) commitment and responsibility for professional development, see in Hungarian at: https://www.oktatas.hu/pub_bin/dload/unios_projektek/kiadvanyok/utmutato_a_pedagogusok_minositesi_rendszereben_6.pdf.

teacher avoiding career promotion, or leaving the teacher career could be the most serious consequences of the introduction of ESD competence within the teacher evaluation system without a sophisticated preparation process. The resistance could diminish if the schools are ensured that ESD evaluation could not be used against them in any way.

There were three evaluation aspects rejected by the majority of all respondents. ESD evaluation based on hard environmental data, such as carbon footprint, water footprint, and principals' performance assessment, seemed to be impossible to be integrated into the evaluation systems of ESD of Hungarian schools, because teachers and especially principals feel that they have almost no control on energy and water systems of their buildings and would not submit themselves to an ESD assessment solely based on principals' performance. Therefore, it would not be fair to evaluate ESD on data that schools and teachers could not have an effect on or on only by the performance of the school leader. This result suggests that reconsideration of the role of the principals and teachers in the maintenance of schools is required, if we would like to integrate the evaluation of the environmental outcomes into the evaluation system of schools. In addition, it also confirms that the whole institutional ESD cannot be evaluated as a single managerial job.

On the other hand, the evaluation of school documents (annual work plan of the schools, lesson plans, etc.), the data about participation in ESD-related activities, and the data about ESD-related communication activities (press releases, parents meetings, etc.) are generally accepted by teachers as a relevant way of evaluating ESD. These are presumably convenient and safe evaluation methods, which simultaneously involve a lot of work, and their efficiency on ESD outcomes is questionable.

Respondents express some overall concern about evaluating ESD competences of teachers. Unless ESD has been a part of the Hungarian National Core Curriculum for decades, there are teachers still arguing against the evaluation of teachers' ESD competences, because they consider it a non-compulsory extra work of dedicate teachers. Other argument against the introduction of any evaluation system is that the costs of development, implementation, and running such a system will give significant returns to the educational practice. These results show that a participatory development method and a careful planning are needed for the development of any evaluation system of teachers' ESD competencies, pupils', teachers', and schools' ESD performance to avoid teacher's resistance and to find a cost-effective and more teacher-friendly way of evaluation, which could significantly improve the quality of ESD in schools.

One of the most teacher friendly ways of evaluation, which was often suggested by respondents, is to introduce a teacher appraisal system. It should be based on a teacher professional profile (or teaching standards), i.e., a clear and concise statement of what

teachers are expected to know and be able to do. Teaching standards should reflect the sophistication and complexity of the knowledge and skills that teachers need to achieve student learning objectives at different stages of their career. They also need to recognize expertise developed on the job, be informed by research, and benefit from teacher involvement in their development. Teaching standards, different levels of performance, and appraisal criteria need to be clear to all those involved in teacher appraisal (OECD, 2013).

Taking all of the aforementioned aspects into consideration, the following evaluation methods seem feasible in the medium term.

1. Transformation of the existing pedagogical evaluation systems on individual, and school levels to focus them on ESD competences, and prepare teachers, principals, and evaluators to apply the renewed systems.

2. Operating a system of acknowledgment and reward system for innovative ESD educators to facilitate continuous innovation of ESD.

3. Periodic external assessments, with experimental and awareness measures, especially for evaluating student groups and teacher groups.

One obvious limitation of this study is that there are no data on student level about the effect of teachers' ESD competencies on pupils learning. It is due to the fact that at the moment there is no nationwide pupils' measurement with ESD element in Hungary. As there are promising international initiatives, e.g., PISA global competencies (OECD, 2018), to introduce the ESD element examples in pupils measurement, we could hope that we will be able to complete the range of this study in the coming years.

Acknowledgements

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Both the authors take responsibility for the integrity of the data and the accuracy of the data analysis.

Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. The Hungarian Institute for Educational Research and Development approved the study.

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