A UNIFIED DIDACTIC FOUNDATION FOR AARHUS UNIVERSITY'S TECH FACULTY: EXPERIENCES AND IMPACT

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ABSTRACT

This paper describes the data collection and analysis of a survey on the awareness and usefulness of a didactic foundation among the educational management at Aarhus University's TECH faculty. The didactic foundation is a document containing a set of principles and guidelines for designing and delivering high-quality education. The survey was conducted using a web-based questionnaire that was sent to 31 respondents who had different roles in the educational management, such as head of degree program, deputy head of department, vice dean, etc. The response rate was 68%. The research found that most respondents are aware of the didactic foundation document and see it as a useful tool for enhancing teaching quality and communication. Despite its usefulness, implementation is hindered by lack of resources, unclear mandates, and lack of motivation among faculty. The content is generally agreed upon, but respondents highlight challenges in practical implementation. The responses may reflect the dual roles of respondents as both teachers and part of the educational management. The paper describes several follow-up strategies. It emphasizes the importance of making educational resources easily accessible and fostering communication among educational management, teachers, and students. It suggests conducting a follow-up study to understand the level of awareness about the didactic foundation among students and teachers. We also highlight the need for integrating the foundation into existing events like pedagogical days and section meetings, to avoid 'meeting fatigue' and foster discourse on educational quality. Finally, the paper underscores the didactic foundation's role in facilitating a smooth transition for new students and promoting student retention.

KEYWORDS

Pedagogical development, didactic foundation, education quality, teaching and learning, change management, Standards: 6, 10, 12.

INTRODUCTION

In the realm of higher education, it is a common phenomenon for institutions to assert their commitment to 'high quality learning and teaching' (Harvey & Green, 1993). These assertions are often found in mission statements, where universities and colleges pledge to deliver excellent teaching and foster a high-quality learning environment (Middaugh, 2010).However, the clarity and strategic pursuit of these objectives are often questionable (Gibbs, 2010). In many instances, the definitions of 'excellent teaching' and 'high-quality learning environment' remain ambiguous (Prosser & Trigwell, 1999). The strategies employed by these institutions to achieve these objectives are diverse and often reflect the historical traditions, values, and practices inherent to each institution (Tight, 2012). Therefore, it is imperative for higher education institutions to clearly define and strategically pursue their teaching and learning objectives to ensure the delivery of high-quality education.

In January 2022, the Faculty of Technical Sciences (TECH) at Aarhus University (AU) established a working group tasked with formulating a didactic framework for instructional practices within the TECH domain (TECH faculty at Aarhus University, 2023). This initiative arose in response to the imperative of constructing a unified educational platform, fostering pedagogical competence enhancement and other scholastic endeavours within the faculty. This was precipitated by a recent history of organizational consolidations and transformative alterations, culminating in the formulation of a new collective strategic framework. The primary mandate of the working group was to delineate pivotal elements in support of forthcoming pedagogical approaches at TECH, and to proffer a universally recommended foundation upon which TECH instructors could collectively scaffold, deliberate, and enhance their instructional methods. This work was reported and evaluated in Øien & Bennedsen (2023), with a focus on the content, the development process, and the relation to the CDIO framework. The foundation is both inspired by and aligns well with the CDIO standards and syllabus but was deliberately simplified and 'translated' to local conditions and culture to support broad understanding and ownership.

Now the didactical foundation has been around for almost a year, so one may expect to see some concrete results from use of the work. Hence, this paper will evaluate the TECH faculty's experience with the didactic foundation so far, and most importantly, its impact – e.g., on educational development, strategic priorities, pedagogical choices, and communication strategies. Such impact may be gauged at several different levels:

- The **educational management**: The vice dean of education, deputy heads of department for education, study program responsible
- The **general management**: Heads of departments, heads of sections
- The **teachers** and **course responsible**. Each course can have several teachers, one is the responsible one for e.q. changes.
- The **students** at TECH

In this paper we will concentrate on assessing the knowledge of the didactic foundation in the *educational and general management*. Leaders in academia are important for the change to happen; not because they manage change but, as Buller (2014) note "*It's something that they lead, initiate, guide, and occasionally capture*". Therefore, we aim to assess whether the key actors on these levels know that the didactic foundation exists, do they understand and agree with its recommendations and guidelines, which of them have actively used it or been explicitly exposed to it, how have they used it, what is their general perception of its usefulness, do they see challenges or barriers for its use which need to be addressed, etc. The assessment is

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done via a survey. This paper will analyse and reflect upon the survey responses, with the aim of identifying transferrable follow-up strategies that may serve to strengthen the positive impact of such a framework.

RELATED WORK

Gedda, Nilsson, Stenberg and Post (2016) elucidate the development of "The Pedagogical Idea" at Luleå University of Technology. This initiative aimed to communicate the core values of teaching and learning across the entire university, encompassing diverse fields such as healthcare, art, and teacher education. However, the authors highlight that this initiative was born out of a less successful development process that led to the creation of "The Creative University". This concept incorporated elements of Knowledge Building and Arenas for sharing of practice but was met with resistance due to its top-down implementation approach. The authors argue that the transition of these concepts to the teachers, who were expected to implement them in their teaching contexts, was not adequately facilitated.

Furthermore, "The Creative University" was grounded in the principles of student-centred learning, which necessitated a high level of educational knowledge and teaching skills among the university professionals. This, according to Gedda et al. (2016), posed significant demands on the faculty.

Many universities have introduced pedagogical training courses and the solution to achieve better teaching (Ödalen, Brommesson, Erlingsson, Schaffer, & Fogelgren, 2019). However, they find

>*the positive effects of pedagogical training courses to be present mainly in the group of participants with less than three years of teaching experience* (p. 339)

Additional tools for enhancing the teaching are thus needed. Warfvinge, Roxå and Löfgreen (2018) finds that a critically important element for enhancing teaching quality is to develop arenas where the teachers discuss their teaching, stating that *'academic leaders must ensure that teachers have the opportunity to engage in informed pedagogical discussions in their workplace'*. But there is a need for structuring the discussion; this is the aim of the pedagogical framework.

RESEARCH DESIGN

This section describes how we have collected and analysed data.

Respondents

The focus of this paper is educational and general management. The educational management structure for the TECH faculty has the following roles:

1. **Head of degree program (HoDP)**: In total there are 26 bachelor's and master's degree programs at TECH. Several of the degree programs have the same HoDP, in total the number of HoDPs are 21.
2. **Deputy Heads of Department for education**: Five departments at TECH have educations, each have a deputy head. Two are also HoDP.
3. **Vice Dean for education**
4. **Head of Study administration**

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5. **Head of section, Board of Studies Support and Studies Quality Assurance,**
6. **Member of study board:** TECH have two study boards (one for the engineering programs, one for the agricultural science educations). Five faculty are members, two have one or two of the other roles.
7. **Director of Studies:** Associated with the study programs is a director of studies. One of the directors of studies is also HoDP.

In total there were 31 respondents. Some had more than one role; consequently, we asked people to state their role when answering.

Data collection

Respondents are very busy people. We expected the best way to get information within the available time constraints, was to allow the respondents to answer at a time of their own choosing, and consequently created a web-based questionnaire focusing on the awareness, usefulness, concrete use, agreement, enablers, and barriers among the respondents. The questionnaire contained both closed-ended and open-ended questions. The questionnaire was initially developed by one of the authors; the second author subsequently quality-checked the questionnaire. Appendix A contains the complete questionnaire. Later, we expect to get more detailed information based on the responses by interviews.

An email invitation was sent out to the 31 respondents; after 1½ week a reminder was sent out.

ANALYSIS AND FINDINGS

This section describes the key findings based on analysing the responses from the respondents.

Response Rate

The questionnaire was distributed to 31 respondents based on their role in the educational management at TECH. 23 answered the questionnaire (20 completed it, 3 gave some answers), giving a response rate of 68%. Several have different roles, therefore the first question focused on what role the respondents took upon them when answering the questionnaire (21 out of 23 answered):
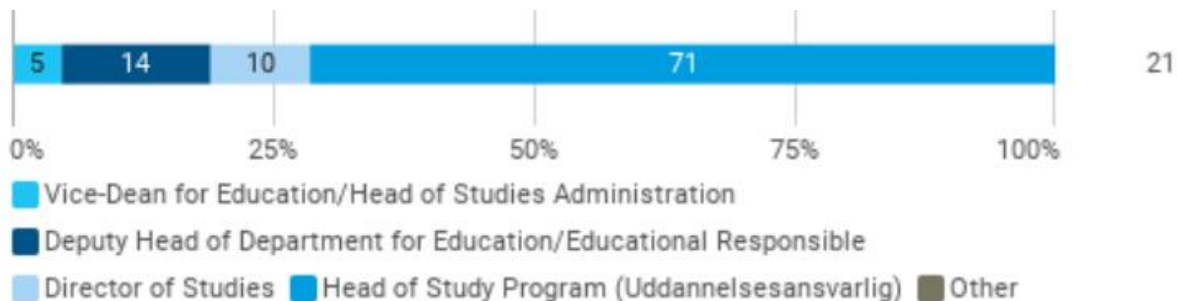

Figure 22: Role of the respondents.

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Awareness and usefulness

The respondents were subsequently asked about their awareness of the didactic foundation (Figure 23). The didactic foundation was established about a year before the survey was done and had been shown and discussed in some settings.
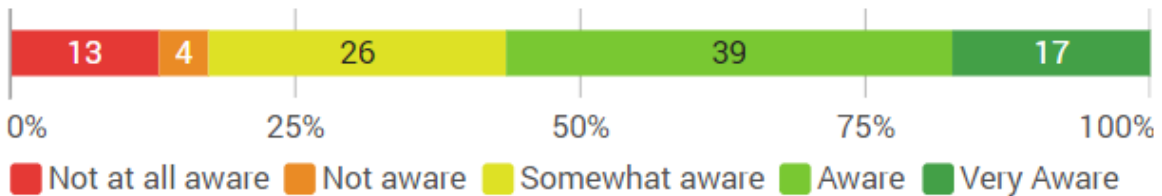

Figure 23: Awareness of the didactic foundation (23 answers)

The respondents who were not aware of the didactic foundations all had the role of Head of Study Program (3 respondents out of 17).

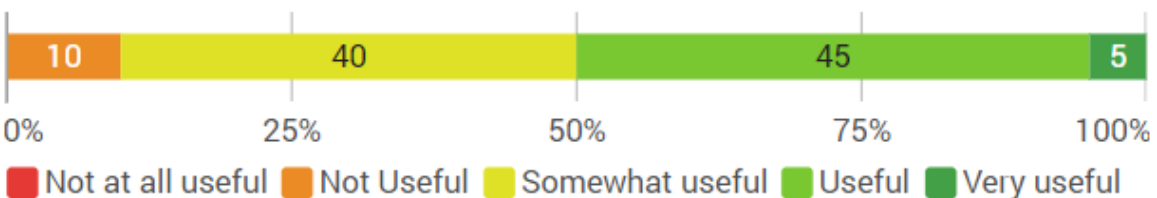Half of the respondents found it useful or very useful (Figure 24).

Figure 24: Usefulness of the didactic foundation

Again, the respondents who found the didactic foundation "not useful" were Heads of Study Program (2 out of 15 answers). An interesting detail is that one of the "not aware" respondents found the didactic foundation "useful".

When asked about the rationale for their evaluation of the usefulness, the most common answer was that it is useful but that more help with implementation is needed.

Understandability and agreeability

When asked if there are elements of the didactic foundation that they do NOT understand, only a few answered, and the answers were mostly about concrete things that are not currently in place (e.g. optimal planning, the time plans arriving very late). Only one respondent had a concrete issue with the description:

> *Not happy with the term institution - I need person somebody to be held accountable. Not just [building service] or IT or whomever contractor has been assigned to provide facility service. Make it accountable. Responsible for "Students" are clear, for "Lecturer" are clear. Institute not.*

The didactic foundation is in general seen as a description that the respondents do not disagree with. It is seen as something that describes aspects of good teaching and learning.

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Plan for use

The respondents were asked "*how do you plan to use the didactic foundation*" (Where do you plan to use the didactic framework. There were given a number of possibilities; these possibilities were generated from literature and on the basis of common problems and practices experienced by the authors:
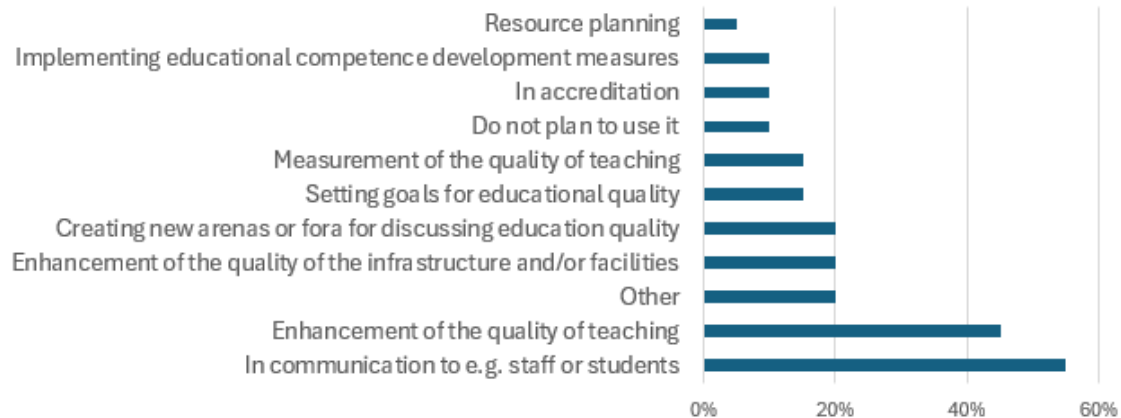

Figure 25: Where do you plan to use the didactic framework.

The "upper management" (Vice dean for education/Head of Studies administration, Deputy head of department and director of studies) all focus on assessment/enhancement of quality (teaching, infrastructure, setting goals, accreditation).

In the introduction and communication about the didactic framework, it has been stressed that it is not intended as a measuring stick, but a dialogue tool. Therefore, it is somewhat surprising that 15% wants to set goals and measure the quality of teaching.

Barriers

The respondents were asked to indicate what (if any) barriers they could see to the use of the didactic framework (Figure 26: Barriers.):

Figure 26: Barriers.

As in other surveys, time is a very critical factor. The workload of academics has increased, leaving less time to develop one's pedagogic competences (Tight, 2010). Higher education has undergone such remarkable transformations over the last decades implying that the teachers may feel a "reform fatigue" (Krücken, 2014)

DISCUSSION OF THE KEY FINDINGS

Most respondents are aware of the didactic foundation document, and report that they understand its contents and see it as a (potentially) useful tool. Some comment that it is "hard to disagree with". We see this as a positive thing, as the intention was not to make something controversial, but to create a tool to strengthen a dialogue among already very qualified teachers. Another part of the motivation for the foundation was to create a shared basis which could serve to integrate several academic subcultures at the merged TECH faculty; also, in the light of this goal it is a good thing that so many see the points in the document as 'obvious', 'hard to disagree with', and 'just stating what we already know'. This makes the more developed description an easier starting point for a dialogue.

The most common reported areas of (planned) use among the respondents are: communication to staff and students (55 %), enhancement of the quality of teaching (45 %), enhancement of quality of infrastructure/facilities (20 %), and creation of new fora/arenas for discussing education quality (20 %). The foundation is also seen as useful in planning of e.g., study programs/courses/infrastructure. It is seen as particularly useful as a dialogue and communication tool. More than half of the respondents (> 70 % of those who answered) have already used parts of the document, with particular focus on the roles of lecturer and student. This indicates that the implementation is on its way. Naturally, one could hope for a 100% usage, but only one year has passed since the launch.

The most common barriers seen for use among respondents are lack of resources (time, money, learning spaces, people – in that order, with time the by far most important), unclear mandates (responsibilities), and lack of motivation among faculty. Many of the study programs taught are professional bachelor programs, where the staff's focus point is mainly teaching. In the later years, it has been very difficult to attract professionals to become teachers (the typical teacher for a professional bachelor's program holds a master's degree and have 10+ years of industrial experience).

Several respondents point out in their written comments that the document is 'hard to disagree with', is uncontroversial, and points to a lot of good intentions - but that they see several challenges related to implementing the guidelines in daily practice, due to lack of e.g., time, suitable learning spaces, administrative facilitation, or (institutional) management support. The degree program responsible (the major number of respondents) also teach themselves, thus one could speculate if some of the answers given are more from their role as teachers rather than their role as part of the educational management.

FOLLOW-UP STRATEGIES

On the practical side, the first (and easiest) thing to do is to make the description easier to find and access on the departmental website.

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Knowledge about the didactic foundation is high among the educational management, but is it also high among teachers or students? A follow-up study on this would be a very relevant starting point since the implementation challenges and strategies for successful follow-up might be very different depending on the knowledge level of the involved parties.

The responses also illustrate the adage that it is all about 'Communication, communication, and communication'. Even among the educational management, three out of the 23 who answered the questionnaire were still unaware of the existence of it. One can only speculate about the degree of knowledge among the teachers, but it seems clear that talking about it, or sending info in a newsletter, is not enough. One strategy might be to use it at departments' pedagogical days/seminars/… - as a way for teachers to exchange ideas on how they facilitate good teaching – e.g., how do you show your passion for the student's learning, how do you ensure that you have necessary knowledge about the other courses the students are taking, etc.

Introduction to new students: When students start at the university, it is a big culture change for them. Tinto (2012) writes in his classic work on student transfer from high school to university that a strong commitment to quality teaching, and the building of a strong sense of inclusion at the institution, are the key factors for successful student retention. The didactic framework can be used to make the expectations to the teacher, the institution, and the students clearer from the get-go, e.g. by being used as a platform for discussion during introductory classes for new students at the start of the first semester.

Currently, an annual pedagogical day is organized for all teachers at the faculty. Using the foundation to facilitate discussions here is a good starting point. Making heads of sections aware of it and giving them easy to use materials for discussing and exchanging ideas at section meetings, also seems like an easy way forward which might lead to broader awareness and strengthened discourse on educational quality. As with the "reform fatigue" there also seems to be a "meeting fatigue" among staff; integrating it into an already existing meeting structure therefore seems like a better way forward than creating additional structures. Neither is such a strategy expected to foster much resistance among teachers.

CONCLUSION

In general, the respondents were aware of the didactic foundation, which is a very important starting point for the use of it. They generally agree with its content and the described elements of "good teaching and learning".

The main barriers for further use of the didactic foundation are lack of resources (a very high load on the academic staff), not enough arenas for discussion of good teaching and learning, and a missing communication strategy.

The purpose of the didactic foundation was to create a dialogue tool for discussing good teaching and learning. Further information is needed to evaluate if it serves its purpose for all stakeholders (management, teachers, and students).

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BIOGRAPHICAL INFORMATION

Jens Bennedsen is Professor (ingeniørdocent) in engineering didactics. He received an M.Sc. degree in Computer Science from Aarhus University in 1988 and a Doctor Philosophiae degree in Computer Science from Oslo University in 2008. His research area includes teaching introductory programming, educational methods, technology and curriculum development methodology including technology-based learning and mobile learning. He has published more than 80 articles at leading conferences and in journals and has an h-index of 22. Jens is currently the head of the Software Engineering & Computing Systems Section at the Department of Electrical and Computer Engineering.

Geir Egil Dahle Øien holds an MscEE degree, and a PhD degree in Telecommunications. He became professor at NTNU in 2001, and served as Dean 2009-2019. He managed NTNU's 'Technology Education of the Future' project 2019-2021. Since Jan. 2022 he is back as professor at NTNU's Dept. of Electronic Systems. Geir has extensive experience from periodic supervision of Nordic education institutions' systematic quality work. He served on the board of NORDTEK 2021 – 2023, and led *the Portfolio Board for Enabling Technologies* in The Research Council of Norway 2019 - 2023. In 2022 he was guest researcher at Aarhus University. He currently leads the *Centre for Science and Engineering Education Development* (SEED) at NTNU.

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Appendix A

In January 2022, the Faculty of Technical Sciences (TECH) established a working group to formulate a didactic foundation for instructional practices. During 2022, the working group held a series of meetings with different stakeholders (teachers, students, educational management, administration) and – by February 2023 – finalized and published "the **TECH didactic foundation**". The purpose is to support the dialogue about teaching between the three key players:

You can find the didactic foundation here:
https://kvalitet.au.dk/fileadmin/kvalitetsportal/NAT_og_TECH/TECH/20230112_didactic_foundation_-_EN.pdf

The following questions evaluate the experience with the didactic foundation so far, and its possible impact.

The results of the evaluation will not be linked to specific persons. The data will be used in aggregated form in a publication.

What is your role with education at TECH?

(1) ❑ Vice-Dean for Education/Head of Studies Administration
(2) ❑ Deputy Head of Department for Education/Educational Responsible
(3) ❑ Director of Studies
(4) ❑ Head of Study Program (Uddannelsesansvarlig)
(5) ❑ Other _____

Are you aware of TECH's didactic foundation?

(1) ○ Not at all aware
(2) ○ Not aware
(3) ○ Somewhat aware
(4) ○ Aware
(5) ○ Very Aware

How do you see the usefulness of the didactic foundation?

(1) ○ Not at all useful
(2) ○ Not Useful
(3) ○ Somewhat useful
(4) ○ Useful
(5) ○ Very useful

Why did you evaluate the usefulness the way you did?

_____
_____

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_____
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_____

Which specific usages can you see for the didactic foundation?

_____
_____
_____
_____
_____
_____

Are there elements of the didactic foundation that you do NOT understand? Please comment in the text field.

(1) ❑ Why the three key players are student, lecturer and institution _____

(2) ❑ One or more of the elements for the student (Engages in own learning, Establishes good conditions for own learning, Contributes to a good learning environment) _____

(3) ❑ One or more of the elements for the lecturer (Has an eye for the student(s), Creates an inspiring learning environment, Demonstrates high subject knowledge, Ensures coherence with other disciplines and society) _____

(4) ❑ One or more of the elements for the institution (Ensures good educational facilities and physical surroundings, Ensures optimal planning, Facilitates co-operation between relevant stakeholders, Ensures opportunities for upgrading of qualifications and competency development) _____

(5) ❑ Other _____

Are there elements of the didactic foundation that you do NOT agree with? Please comment in the text field.

(1) ❑ That the three key players are student, lecturer and institution _____

(2) ❑ One or more of the elements for the student (Engages in own learning, Establishes good conditions for own learning, Contributes to a good learning environment) _____

(3) ❑ One or more of the elements for the lecturer (Has an eye for the student(s), Creates an inspiring learning environment, Demonstrates high subject knowledge, Ensures coherence with other disciplines and society) _____

(4) ❑ One or more of the elements for the institution (Ensures good educational facilities and physical surroundings, Ensures optimal planning, Facilitates co-operation between relevant stakeholders, Ensures opportunities for upgrading of qualifications and competency development) _____

(5) ❑ Other _____

Are there elements of the didactic foundation that you have actively used (e.g. in meetings or workshops)? Please comment in the text field.

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(1) ❑ That the three key players are student, lecturer and institution _____

(2) ❑ One or more of the elements for the student (engages in own learning, establishes good conditions for own learning, Contributes to a good learning environment) _____

(3) ❑ One or more of the elements for the lecturer (Has an eye for the student(s), Creates an inspiring learning environment, Demonstrates high subject knowledge, Ensures coherence with other disciplines and society) _____

(4) ❑ One or more of the elements for the institution (Ensures good educational facilities and physical surroundings, Ensures optimal planning, Facilitates co-operation between relevant stakeholders, Ensures opportunities for upgrading of qualifications and competency development) _____

(5) ❑ Other _____

If you have actively used the didactic foundation, how have you done it?

_____
_____
_____
_____
_____
_____

How do you plan to use the didactic foundation?

(1) ❑ Resource planning

(2) ❑ Enhancement of the quality of teaching

(3) ❑ Enhancement of the quality of the infrastructure and/or facilities

(9) ❑ Setting goals for educational quality

(4) ❑ Measurement of the quality of teaching

(10) ❑ Implementing educational competence development measures

(5) ❑ In accreditation

(8) ❑ In communication to e.g. staff or students

(11) ❑ Creating new arenas or fora for discussing education quality

(6) ❑ Other _____

(7) ❑ Do not plan to use it

What barriers do you see to the use of the didactic framework?

(9) ❑ Lack of motivation among faculty

(11) ❑ Conservative faculty/education culture

(1) ❑ Lack of resources (time)

(7) ❑ Lack of resources (money)

(8) ❑ Lack of resources (people)

(16) ❑ Lack of resources (learning space)

(2) ❑ Unclear mandates (who takes the initiative, who has the responsibility for what)

(3) ❑ Uncertain how to use it/what to use it for in practice

(4) ❑ No obvious places (e.g. meetings) where to use it

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(10)   ❑ Logistical barriers (scheduling of courses, lectures, exams etc)

(12)   ❑ Lack of arenas where the three key players can systematically interact to improve education

(13)   ❑ 'Reform fatigue' among employees

(14)   ❑ Lack of management authority and trust among key players

(15)   ❑ Other priorities are currently more important (please specify) _____

(5)   ❑ Other _____

(6)   ❑ No barriers

Do you have other comments about the didactic foundation or the questionnaire?

_____

_____

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