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AGILE GOVERNANCE FOR INNOVATING HIGHER EDUCATION TEACHING AND LEARNING

In the field of study and teaching at universities today, digitisation is the cause and driving force for change and innovation. Online teaching, blended learning and new digital techniques for data structuring, simulation and interaction offer many opportunities for revising and renewing teaching and examination content, curricula and also communication between students and academics. In Germany, however, the Humboldtian principle of «freedom of teaching and research» applies. According to the German Basic Law and the Higher education acts of the German federal states, university lecturers are free «in their way to hold courses and to organise their content and methodology» and are therefore not obliged to develop their teaching techniques. To reform teaching, we propose agile processes that emphasise self-direction, collaboration, and lightweight procedures. In software development and business operations, such methods have proved to be successful in dealing with changing technologies and product requirements. In higher education, agile-based instructional methods are used but are not yet the method of choice. In this paper we present a novel agile governance approach for fostering innovation in university teaching and learning. The so-called «multiplier method» is also based on ethical principles and consists of two steps. Firstly, academics carry out innovative, self-selected teaching projects in small teams; they are coached by experts and also receive training on relevant topics such as teaching, inspiring, and leadership. Secondly, the participating academics act as multipliers: they pass on their experiences to their colleagues and become contact persons for good teaching in their faculties. The «multiplier method» was successfully tested in a large teaching innovation initiative. Over a period of 9 years, more than 150 individual innovation and online learning projects were successfully implemented.

KEYWORDS *Agile Governance, Software Development, Teaching and Learning, Higher Education, Multipliers.*

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1. Introduction

Higher education is in a situation of change. Ten years ago, massive open online courses had a worldwide success across learners. Since last year, the pandemic has acted as a catalyst and accelerator of digital teaching. It has suddenly turned learning and teaching at traditional universities into online education. Even core traditional universities started to invest heavily in the support of digital teaching methods and infrastructures such as video conferencing systems and digital examination platforms.

But although infrastructure and funding are necessary ingredients they are far from being sufficient for good digital teaching and learning. New teaching and learning techniques require testing and training, curricula have to be further developed, students need adequate support.

Good governance of digital teaching must take all these aspects into account and bring them into one big whole, despite conflicting goals of the stakeholders, i.e. of students, faculty, and administrative staff. Classic hierarchical top-down governance does not seem to be adequate, especially in the German system where professors have great freedom of teaching and research. Instead, we propose agile processes that emphasize self-direction, collaboration, and lightweight procedures.

In software development and business operations, such methods proved to be successful for dealing with changing environments, technologies, and product requirements. In higher education, agile-based instructional methods are used mainly in computer science and engineering, and occasionally also in other fields. Agile governance for higher education projects has been proposed but is not yet the method of choice.

In this paper, we present a novel governance approach for fostering innovation in university teaching and learning. The so-called «multiplier method» is based on agile and ethical principles. It is a two-step process. In the first step, academics carry out innovative, self-selected teaching projects in small teams; they are coached by experts and also receive training on relevant topics such as teaching, inspiring and leadership. In the second step, the participating academics act as multipliers: they pass on their experiences to their colleagues and become contact persons and role models for good teaching habits in their faculties.

The multiplier method was successfully proven in a large teaching and online innovation initiative called the Multiplier programme that was part of the Lehre@Lmu project, which was funded by the German Ministry for education and research Bmbf from 2012 to 2020. The aim was to combine excellent and innovative teaching with appreciation and values such as fostering au-

tonomy, social integration, and skills of students. The Multiplier Programme comprised more than 150 individual innovation and online learning projects. The governance of the projects was agile: the project topics were self-selected by the project teams at faculty level, the project teams worked in an agile way and brought together «tandems» of professors and teaching assistants with students, pedagogic coaches, and e-learning experts.

In the following, we briefly review the agile approach to software development (section 2) and its application to teaching and learning (section 3). In section 4 we address the role of multipliers for disseminating innovations and in section 5 we discuss some governance issues for teaching and learning at German universities. In Section 6 we present the agile governance approach for innovating higher education teaching and learning and in section 7 we illustrate our approach through our experiences with the Multiplier programme at Lmu Munich. Section 8 concludes the paper with a summary of our approach.

2. Agile governance of software development

In the 1990s, software development was in a crisis. According to a report of the Standish Group (Standish 1994), more than 30% of all complex software projects were cancelled before they got completed – with an estimated cost of more than \$ 80 billion. In the same period, the novel paradigm of object-oriented programming triggered new ideas for the management of software development. In 2001 a group of distinguished software engineers met at Snowbird, Utah, and wrote the « Manifesto for agile software development» (Beck *et al.* 2001). The manifesto postulated radical new values and principles for developing software, many of which were not specific to software but addressed good ways of governing complex projects.

Twenty years later, in 2020, more than 70% of the software companies worldwide were using agile development methods with success. The failing rate of agile software projects is as low as 8% whereas for classical software projects the failing rate is higher than 20% (Djurovic 2021).

What is the core of agile governance? The manifesto puts forward values and principles. Traditional governance practices such as processes, tools, contract negotiation, and plans are seen as valuable, but the emphasis is on individuals, interactions, customer collaboration, and reaction to change. There are twelve basic principles. The first ones stress customer satisfaction and collaboration, openness to changing requirements, and more software-specific: working software as a measure of progress and frequent software delivery. The remaining principles address good general governance practices: projects

should be built around motivated individuals and self-organizing teams; the most effective method of conveying information is face-to-face conversation, all those involved in the project should not be overburdened and should be able to maintain a constant working pace. Finally, attention to technical excellence and simplicity of solutions is considered to be essential.

Well-known agile development and governance methods are Scrum (Schwaber 1997), XP (Beck 1999), and Kanban (Anderson 2010). They are lightweight frameworks that are based on the values and principles of the manifesto and can be instantiated for governing many kinds of projects.

For example, Scrum has five key values that complement the values and principles of the manifesto: commitment to achieving goals and supporting each other in the project, focus on the current project goals, openness about the work and the challenges, respect for the co-workers, and courage to do the right thing, to work on tough problems.

At the beginning of every Scrum project stands a vision of what the new product should look like. All further activities are aligned with this vision. Product development takes place iteratively in feedback loops, so-called sprints. Each sprint begins with planning of the tasks and ends after a fixed period of a few weeks; at the end, the results are reflected and reviewed. During the project execution, the project team is supported and coached by a so-called «Scrum master» and a «product owner» specifies the work to be performed.

3. Agile approach to teaching and learning

Agile governance techniques were originally developed for software engineering applications. However, they are more general: methods like Scrum can be used for many other fields. In the field of teaching and learning, the agile approach has been proposed and tested mainly for use in classroom teaching.

In 2009 (Stewart *et al.* 2009) were among the first to map the agile manifesto to pedagogical methodologies. As pedagogic values they emphasize student-centric learning, projects, student and instructor collaboration, and feedback rather than traditional processes, comprehensive documentation, course syllabi, and plans. The twelve agile principles are directly mapped to educational environments.

Kamat (2012) reflects on practices in higher education in India and proposes an «Agile manifesto in higher education». Similar to Stewart *et al.* (2009), he values students, teachers, competence, and collaboration but he emphasizes also employability, marketability, attitude, and learning skills.

Building on these and other works such as (D'Souza and Rodrigues 2015; Royle and Nikolic 2016), the «Agile manifesto for teaching and learning» of Krehbiel *et al.* (2017) proposes adaptability, collaboration, achievement of learning outcomes, student-driven inquiry, demonstration and application, and continuous improvement as main values and puts classical values such as prescriptive teaching methods, classroom lecturing, and student testing and assessment in the second row.

Because of their roots in computer science, educational agile techniques are mostly applied to computer science and engineering courses, see e.g. (Stewart *et al.* 2009; Kamat 2012). But Krehbiel *et al.* (2017) also show examples of agile pedagogy in social sciences. Nikolic and Gledic (2013) apply agile techniques to collaborative curricula and course development and argue that «institutions of higher education must develop their capacity for change and transform their strategies, from constructed-beforehand to permanently-in-construction». Ivetic and Ilic (2020) conclude that university teaching as well as teaching governance could benefit from testing and incrementally implementing agile practices.

More generally, Twidale *et al.* (2013) propose to translate the agile values and principles to the university context and to rethink teaching, research, and university operations in an agile way.

4. Multipliers for innovation dissemination

Agile processes are helpful and appropriate for developing innovations, but they are not sufficient to implement innovation across the entire organisation.

Often change processes are not successful because the members of the organisation are not convinced of the necessity and benefits of the innovations. In order to be able to persuade a hesitant or even rejecting majority of the innovations, role models are needed who support the new ideas and actively spread them among all members of an organisation. Cultural changes are made by people, but they are also prevented by people. According to Eberhard Witte (1973), the transformation of an organisation can only succeed if there are supporters, so-called multipliers, of the planned innovations who are experts in the field concerned and who know the arguments that can be used to convince the members of the organisation, such as the lecturers of a faculty.

A major challenge for the multipliers is to transport the new ideas in a language that can be understood by every member of the organisation. This should be done mainly through personal communication and individual justi-

fications. A second challenge for the multipliers is to differentiate between the different attitudes of the members of an organisation.

The «2+/6/2-» rule (Frey 2015) is often inducted for this purpose. The rule describes that in a group of ten people at least two people must be positively inclined. Often, six people are neutral and the remaining two are against the innovations. For the organisation, this means that 20% of the members see the innovations positively or even enthusiastically support them, while 60% are neutral and 20% reject the changes. The challenge for the multipliers is to find the right arguments to convince some people from the large neutral part to support the changes. It is equally important to be able to mitigate the negative attitude of the rejecting persons, as strong negative personalities can jeopardise the success of the whole innovation process. According to McGuire (1981; 1986), it is therefore important to select multipliers who possess the following characteristics: competence, experience, trust, empathy, communication skills, and assertiveness.

It also makes sense to prepare multipliers for their tasks through coaching and training and to make the multiplier programme visible in the organisation. Without the former, the success of the transformation process could be jeopardised; the latter supports the public impact of the multipliers.

As in agile projects, collaboration and team reflection are important for multipliers. West and Anderson (1996) and West (1990; 1997) clearly show that reflections on strengths and weaknesses are an essential tool for continuous improvement. Team reflection also promotes an atmosphere of team spirit.

Multipliers are often in a minority position that differs from the majority opinion. This makes it difficult for multipliers to convince others, but there are strategies they can use to do so. For example, Moscovici's theory of minority influence (Moscovici 1976; Moscovici 1980) says that the minority should speak with one voice and always repeat their statements and back them up with success stories, but that the minority also needs patience and should show flexibility to adapt their arguments to different target groups.

5. Governance of teaching and learning at German universities

Until 20 years ago, teaching and learning at German universities had a rather flat and flexible organisation. The universities offered three types of degrees: Diploma, Magister and Staatsexamen. The study programmes offered by a university were decided in the university senate. Proposals for introducing,

amending, or abolishing a degree programme were put forward by the respective faculty and then discussed and decided in the senate. Typically, curricula had only a small kernel of standard (introductory) courses; most other courses had specialised topics and professors decided about topics and contents on a yearly basis. Except for the standard courses, students were free to select the courses of their choice. The number of required «Scheine» for admission to the (oral) examinations was also rather low and the contents of the oral examination were agreed upon between professor and examinee.

The Bologna process replaced the Diplom and Magister degree programmes by the Bachelor's (Ba) and Master's (Ma) system and brought a formalisation and standardisation of study procedures and regular external evaluations. This made studying more structured and easier for students to plan and calculate. These changes were also sorely needed, since from 1980 to 2000 the proportion of young people with a higher education entrance qualification rose from 22% to 33% of a population cohort, and at the same time the number of first-year students rose from around 190,000 to around 314,000, an increase of more than 50% (Statistisches Bundesamt 2002). As a result, it had become more and more difficult to manage the rather individual study courses of diploma and master's degree programmes efficiently.

One drawback of the new Ba and Ma system is that the examination and study regulations must be adapted for every change in the range of courses offered. A posting on the notice board of the study dean is no longer sufficient. It also became more difficult to offer changing special courses and to involve external lecturers in the study programme.

A major advantage of the Ba and Ma system, however, is the introduction of structured quality management processes. The required regular external evaluation not only contributes to the review of the quality of the studies, but also promotes the internal reflection on the study contents and contributes to the further development of the study programmes and a systematic quality management of teaching and learning. Moreover, lecturers are increasingly required to have teaching competence in addition to subject-specific competence. At many universities, including Lmu Munich, training courses in higher education were set up for this purpose – many were designed to be interdisciplinary.

However, splitting the degree programmes into Ba and Ma led to a significant increase, even a multiplication of the number of degree programmes. Instead of one degree programme with several selectable specialisations, there are now several special master's degree programmes with slightly different orientations. In the last thirteen years, the number of degree programmes in Ger-

many has almost doubled from approximately 11,000 in 2007 to over 20,000 in 2020 (Dudek et. al 2020).

The aim of the governance of university study programmes was and is to offer students excellent teaching, i.e. teaching that provides them with critical judgement based on scientific research and promotes problem-solving skills and action competence by integrating practical relevance (Wissenschaftsrat 2008). Excellent teaching is based on the quality of the teaching content, the quality of the delivery of the teaching content, the quality of the supervision of the students and the quality of the study organisation. The governance of teaching must control all these aspects and therefore includes diverse tasks such as the coordination and strategic planning of the study organisation and the range of courses, the coordination of student support, internal and external continuing education offers, teaching quality assurance as well as university scholarships and teaching cooperation with other universities.

6. Agile governance for teaching innovation

In the following, we would like to limit our discussion to the question of governance for teaching innovation and illustrate it with examples of digitisation of teaching. Digitisation influences the contents and form of the courses and can promote mobility, diversity, accessibility and the personalisation of study programmes through online teaching; computer-based methods are finding their way into teaching and research, new computer-oriented topics such as «Digital Humanities» are changing study programmes, see e.g. Wirsing (2017).

In the German university system, however, academics cannot be obliged to revise nor advance teaching techniques, course content and curricula. In Germany, after all, the Humboldtian principle of «freedom of teaching and research» applies, which gives academics a special position. According to the German basic law (§5.3) and the Higher education act of the German federal states (see e.g. §3.3 (3) of the Bayer. Hochschulgesetz), academics are free «in their way to hold courses and to organise their content and methodology».

To introduce digitisation into learning and teaching at German universities, it was and is therefore important that academics voluntarily undergo further training in the use of digital systems. Typically, the opportunities for this are offered by the continuing education and media centres that exist at many universities. In the past, these offers were often limited to training in the creation and use of digital media; they did not systematically build up the digital literacy of the teachers. Initial approaches to defining the necessary digital skills

have been presented in recent years, see e.g. the catalogue of competencies necessary for digitisation in the field of teaching (Schultz-Pernice *et al.* 2017).

The training courses of the media centres are important and helpful, but they are often not tailored to the specific needs of disciplines and faculties. However, if digital offers should not only be an add-on to face-to-face teaching, but should really contribute to innovation and improvement of learning and teaching, it is not enough to offer general «top-down» training courses. Novel teaching techniques should be developed subject-specifically in a «bottom-up» way.

The questions are how academics can be motivated to engage in teaching innovations and to revise and enhance their lectures with digital techniques. This is the opportunity for using agile governance techniques.

The main idea is to perform self-selected and subject-specific teaching innovation projects under the guidance of experts and to combine them with project team trainings on relevant topics.

More specifically, the method works as follows: in a first step, two or more academics form a small team and define the objectives for a teaching innovation as well as the goal they want to achieve in their field. Then typically together with the help of some students they carry out this teaching innovation project. From the beginning, they are supported and coached by experts; in parallel, they receive further training measures in relevant topics, such as good teaching or good leadership.

The project implementation should be clearly structured into individual sections. Each section ends with an exchange and a reflection on the results so far and on how to proceed. As usual in project management, each project should start with a kick-off workshop and end with a presentation of the results and a touchdown workshop.

In addition, the method has two other important points: to ensure that teaching innovations are not limited to the individual project, project participants should act as multipliers of good teaching and share their project experiences and the new teaching and learning techniques with their faculty colleagues. If several projects are carried out in parallel, the projects should be networked with each other and the participants should regularly be given the opportunity to exchange their ideas and experiences with other projects.

This method is agile: the topic of the project is self-selected and the project team is self-organised. The project participants are connected and socially integrated through teamwork and networking with other projects and project members. The project duration is not fixed, but depends on the tasks and results. Also, the dissemination by multipliers relies on agile principles.

Multipliers are intrinsically motivated and self-organised, they collaborate and reflect on their experiences with each other.

In the following we present our experiences with such an agile method in a large teaching and learning innovation initiative.

7. Experiences in governing teaching and learning innovations

As part of the German Teaching Quality Pact, the project *Lehre@Lmu* was funded at Lmu Munich from 2012 to 2020 by the German Federal Ministry for Education and Research. The vision of the project was to better integrate research and practical experiences into teaching and learning at Lmu. The *Lehre@Lmu* project was composed of more than ten sub-projects. One of these sub-projects, the Multiplier Programme, targeted the training of Lmu academics and aimed at building a vision and widespread awareness of good teaching. The Multiplier Programme was governed by the Lmu Center for Leadership and People Management and comprised more than 150 individual innovation and online learning projects with more than 300 academics from all 18 faculties of Lmu Munich.

The Multiplier Programme (Pachler *et al.* 2015; Frey and Uemminghaus 2021) was designed based on the method described above, but with an emphasis on ethical values and some additional ingredients such as alumni network, evaluation, and scientific accompanying research. The Programme had the motto «Inspire for teaching. How to be competent in teaching». The focus was on improving the quality of teaching and on promoting research and practice orientation in teaching and learning.

The objective of the Programme was to combine a culture of excellent and innovative teaching with appreciation and to provide participants with knowledge, action skills, and values for dealing with students. The values were based on the ethic-oriented principle model (Frey *et al.* 2010; Frey *et al.* 2012) which comprises twelve principles for good teaching, including transparency, fairness, constructive feedback, positive regard, autonomy and situational adaptation (Pachler *et al.* 2019).

The vision of good teaching is passed to the faculties via multipliers, also known as «change agents». Multipliers are academics that act as contact persons in their discipline. The main task of the multipliers is to initiate the discussion and the development of good teaching in their faculties. The multipliers combine «expertise in higher education didactics, commitment to teaching, good knowledge of the faculty, good contact with students and

openness to new ideas» (Pachler *et al.* 2015; Frey and Uemminghaus 2021). Typical methods of multiplication are further training for faculty, informing in committees, direct visits to faculty lecturers, publications in scientific journals, online tutorials, creation of e-learning offers, and the collection and provision of teaching methods and handouts via online platforms (Lmu Center for Leadership and People Management 2020).

The governance of the Multiplier Programme was agile and «bottom-up» controlled. It was based on the following ten principles (Pachler *et al.* 2015; Frey and Uemminghaus 2021), which were key to its success: information spread through multipliers, intrinsic motivation of the multipliers, discipline-specific aspects of teaching, tandem principle, systematic coaching, inter-faculty exchange, alumni network, as well as need-oriented programme designs, quality assurance and accompanying research.

In particular, the academics themselves took the initiative «bottom-up» to change the teaching-learning culture of their faculties. They were intrinsically motivated, as they were able to choose the topics and goals of the individual projects in a discipline-specific way.

The project teams were self-organised, but had to meet the multiplier requirements of at least two academics: In each project team, a «tandem» worked, consisting of a professor and a research assistant. One of them, or both together, were the product owners of their individual project and both together acted as multipliers in their faculty.

Each individual project received customised and situation-specific support from coaches and experts on didactic, socio-psychological or digitisation issues. Regular workshops involving all ongoing individual projects offered the opportunity for interdisciplinary exchange of ideas and networking with academics and students from other faculties. As alumni, the multipliers remained networked and active as ambassadors of good teaching even after their individual projects had ended. The programme itself had been designed on the basis of a needs' analysis at the university. The quality of the multiplier programme was checked through continuous evaluation and further developed through scientific accompanying research.

The Multiplier Programme was organised in 9 cohorts of about 15 to 20 individual projects each. As a rule, an individual project lasted one year; however, in the case of very ambitious project goals, it was possible to extend projects once or even several times by one year each.

The one-year duration always began with a kick-off workshop and ended with a final workshop and as a touchdown a final symposium involving all projects of the cohort. In between, the individual planning and implementation work and the multiplier activities took place. The activities were structu-

red by an intermediate workshop and by monthly colloquia and seminars on good teaching and techniques for leadership and inspiring students. All these events served to reflect on the project ideas and results and the interdisciplinary exchange with the other multipliers.

The projects involved all faculties. Their contents were diverse and covered a broad range of teaching and learning innovations, including the introduction of new didactic methods, the optimisation of teaching, the redesign of courses, the promotion of teaching competence, the optimisation of examination situations and the improvement of evaluations (Frey and Uemminghaus 2021).

For example, the 18 individual projects of the 8th year in 2019/20 (Lmu Center for Leadership and People Management 2020) involved 13 of the 18 faculties. 11 projects introduced new blended learning and e-learning methods with topics such as the development of an inverted classroom course offering in medicine, a digital learning platform for the most important oriental manuscript collections, or an app for an individual multimedia approach to the history of resistance against National Socialism. Five projects aimed at subject-specific or interdisciplinary learning support for students, such as projects on statistical consulting for social scientists or on stress and burnout prevention for students. The remaining two projects served to develop a new innovative course in the field of law and a teaching network from the field of epidemiology.

Overall, the Multiplier Programme was very successful (Kuonath *et al.* 2016, Lmu Center for Leadership and People Management 2021). Participation was comprehensive and balanced: all faculties voluntarily participated in the Programme, and there were roughly equal numbers of women and men in the project teams. The regular evaluations showed that the participants were mostly very satisfied with the Programme from the beginning; their satisfaction even increased from about 70% in the first cohorts to over 90% in the last cohorts. Teaching competence was rated higher by the participants at the end of the (one-year) Programme than at the beginning; the value of teaching was also rated higher at the end of the Programme than at the beginning. Furthermore, it could be shown that the intrinsically motivated multipliers contributed to improving the teaching climate at their faculties (Specht *et al.* 2017).

8. Summing up

The agile approach has proven itself in ITC for about 20 years and is now the method of choice for innovative development projects. The agile princi-

ples, such as intrinsic motivation, self-responsibility, self-organisation and reflection, are key to this successful development and the good quality of the project results.

Digitisation is changing teaching at universities and requires a rethinking from academics and a revision and renewal of the entire teaching process, including curricula, forms of teaching, teaching content and communication between academics and students. However, this is difficult to implement in Germany as the Basic Law guarantees professors the freedom of teaching and research. But agile methods offer a good solution here as well. We propose a two-step approach, called the multiplier method, for innovating learning and teaching. Motivated teams of academics carry out agile innovation projects to pilot new teaching methods and concepts. Then the academics act as multipliers to spread knowledge of the new techniques throughout the university.

At Lmu Munich, we have tested the multiplier method very successfully in a large project on innovation in teaching over nine years and believe that the ideas of the multiplier method are more general and can be applied to the governance of other innovation processes inside and outside the university.

We recommend using this process much more often, especially in the context of Covid-19. Well known role models, such as politicians, athletes or actors, could receive a short multiplier training and then act as multipliers in their cohort to reach out to people who have not been convinced by the official rules and restrictions so far.

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