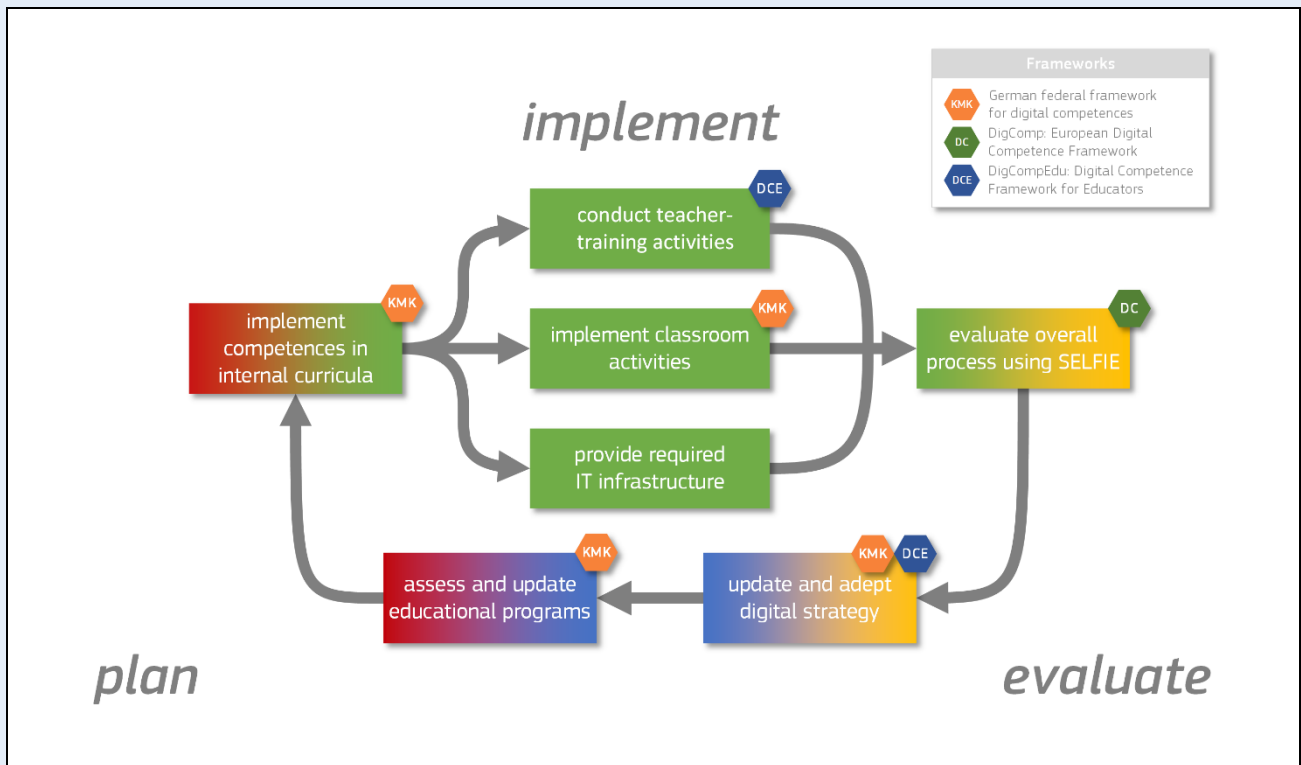


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# EUROPEAN TOOLS AS ELEMENTS OF A SCHOOL DEVELOPMENT MODEL TO INTEGRATE DIGITAL COMPETENCE IN THE CLASSROOM AND PROFESSIONAL DEVELOPMENT



# 1 INTRODUCTION AND CHALLENGE

## 1.1 Background and Starting Position

Ever since we launched our Notebook courses at OSZ Informations- und Medizintechnik (hereafter "OSZ IMT") in 2017, we have focused on supporting the school-wide developmental processes by addressing the question how to lend systematic support to the actions for technological *Digitization and Development of Digital Competence for Students and Teachers* as shared and complementary tasks, and how these can be firmly positioned in continuing professional development and curricular planning. In short, "Digital Learning and Teaching." The use of digital end user devices in the classroom has been summarized under the umbrella term "Digital Teaching and Learning," serving as a tool within the process of learning about digital technology and as a tool in the framework of a more classic media competence. The active implementation team, i.e., school leadership, quality managers and the project team, quickly determined that a strategic ongoing development of "Digital Learning and Teaching" required a deeper integration of disparate leadership levels within our institution than other school development processes.

In this instance, organizational and content-related elements of school development as well as the question of how to keep the teaching staff motivated are much more tightly connected than in other comparable processes within the school. Therefore, it was necessary to develop processes for school development that were different from those tried and tested in order to integrate curricular, technological, didactic and staffing challenges in a better way than before. At the same time, it became necessary to develop or customize the appropriate tools that could accompany the process. This article documents the use of the tools *SELFIE* and *DigCompEdu* evaluated and implemented by us as part of our data-based school development and our plans for professional development.

As an upper secondary vocational school, the Oberstufenzentrum Informations- und Medizintechnik exemplifies the vocational training landscape in Berlin to a large extent: approximately 2,600 students are being trained in various disciplines and educational tracks in the field of IT as well medical technology, starting with different prerequisite fulfillment levels. Up to approx. 1,600 students can be placed at the school in line with local institutional standards. As shown in Figure 1, the institution is divided into four departments with their appropriate educational tracks. Each department is led by a departmental head and a departmental coordinator who in turn are supervised by a subject department manager. Together with the principal and the OSZ Coordinator, the departmental heads form the school management board. The departments are responsible for organizational tasks within the school such as assignment planning and substitution and serve as supervisors.

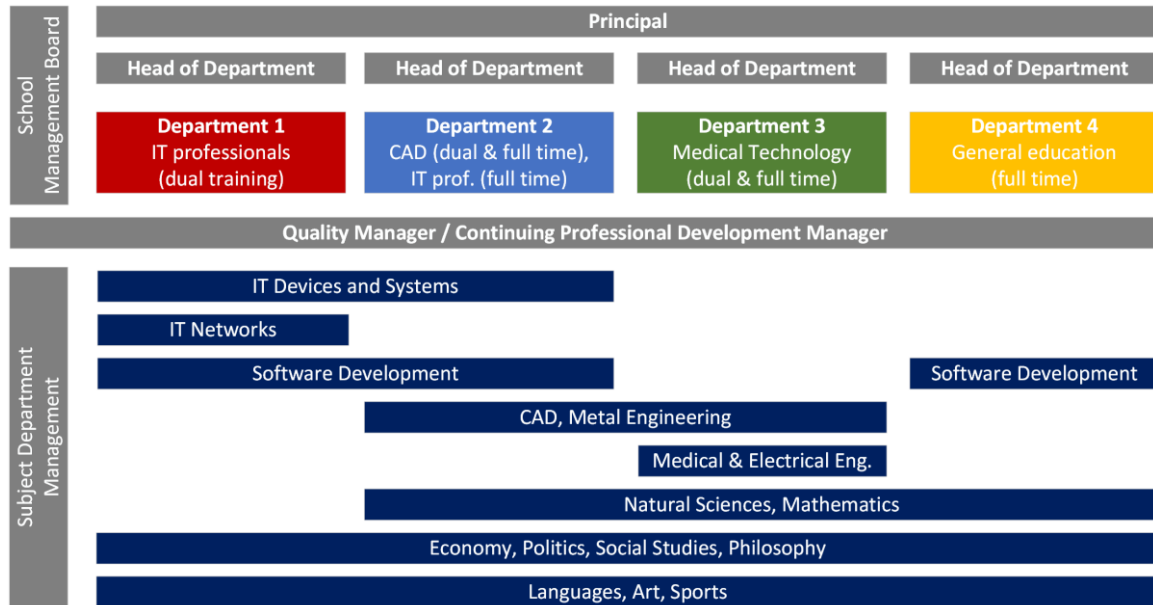


Figure 1: Organizational structure of the OSZ IMT

In their design of the curricula for each educational track, the eight subject departments supply the material for courses or subjects. Each of these educational tracks is led by a subject head in the form of a departmental head, who in turn is supported by two or three assignees who serve as senior teachers. Due to this internal structure, developmental and innovative processes that affect both organizational as well as curricular aspects are inevitably tied to the participation of a variety of leadership roles. The Quality Manager acts cross-functionally in that s/he is the common element between all groups. S/he takes part in all sessions of the school management board as well as the conferences of subject department managers and, in addition, moderates the steering committee "OSZ IMT 2024" that goes beyond the school.

The digital infrastructure at OSZ Informations- und Medizintechnik is considered above average given its teaching focus on IT. Right at the school's inception in 2001, an extensive LAN framework was put in place. Nearly all classrooms have been equipped with digital media for faculty, including teacher PCs, projectors or smartboards. The Wi-Fi infrastructure reaches nearly all interior areas on campus, and more than 800 stationary PCs have been set up inside classrooms. Usage of these digital edge devices over the past few years had, however, been reserved primarily to core subjects and specific courses (i.e., programming, networking, CAD). This is in one part due to the subject-specific structure – a substantial number of student PC desks are located in specialized department classrooms or labs serving primarily the hands-on practice requirements of the field. Second, the digital skills of faculty using the devices for themselves and in the classroom varied greatly – while IT faculty are technically well versed in employing digital devices in the classroom, they may lack the didactic, pedagogic approach to digital tools. On the other hand, faculty from more general departments lack the practical experience of employing digital devices in the classroom (no doubt due to internal resource

allocation) and often focus the discussion instead on a critical analysis of the use and the impact of digital media.

In order to enable an improved allocation and a stronger degree of integration of digital media into the teaching processes, we initiated the first "*Bring Your Own Device*" classes in the dual-track IT education as part of the internal school development project "*Digital Classroom – Job Training 4.0 at OSZ IMT*" for the school year 2017/18. Our goal for dual-track IT education had been a full-scale transition to mobile devices by 2022, supplied by the training companies. Getting this development project started required first and foremost an in-depth discussion with all stakeholders (school leadership, teachers, companies, trainees as well as representatives from the internal IT administration at the school). In that discussion, we needed to establish the technological standards in connection with targeted job training and continuing professional education in order to access existing systems during the first school year. In subsequent school years, we developed and implemented teaching concept adjustments in a *bottom-up* process, based on what we had observed and experienced.

To capture the impact on teaching, we carried out an extensive evaluation of media usage in the BYOD classes during the first year of training and compared those with the regular classes (N=268, of those n=71 in BYOD classes). The key result, not terribly surprising, showed that media usage, bearing in mind also the newly established BYOD classes, centered largely on *Presentation by Teachers* (n=232/86.6%), *Online Research* (n=227/84.7%) and *Presentations by Students* (n=226/84.3%). Other areas, too, showed that while working with digital devices proved to be an important element of student-centric teaching that could easily be implemented from a technological and organizational standpoint, it was unable to fully achieve the envisioned potential of digital tools within the framework of competence-centric learning processes. The result matched the subjective perception of all participants in the school development project and was expected to be similar in other educational tracks not covered by the evaluation.

## 1.2 Emerging Challenges

Two fundamental questions arose internally, based on the experiences and findings of the development project "*Digital Classroom – Job Training 4.0 at OSZ IMT*":

1. How can we, as a technical vocational school with a primary focus on IT, foster a systematic development of digital competence among the faculty as the foundation for good teaching practices in the classroom?
2. How can we define and develop the didactic/pedagogic competences required for teaching?

For a number of years now, the school has run several internal development projects and initiatives on "Digital Learning and Teaching" topics such as the use of learning management

and e-portfolio systems. These processes were, however, only loosely connected and depended in their outcome to a large extent on the enthusiasm of each individual teacher. The prior internal offers at the school were, therefore, conceived of as individual events, with little networking and rarely, if ever, integrated or connected with the work processes within each department or team. What was missing at the time was a targeted, concise integration with existing efforts and a firm embrace and implementation of digitization within the school program, as it has been in existence now since 2019 (OSZ Informations- und Medizintechnik 2019, 34-37). In addition, the development of didactic-pedagogic approaches in the field of "Digital Learning and Teaching" and their inclusion in the internal curricula did not, as initially intended, take place within each department or team. One of the main reasons for this shortcoming was a lack of understanding – among those directly involved in teaching – of the processes and experiences gained during the first years of implementing "Digital Learning and Teaching" in the daily teaching practices.

### 1.3 European Tools As Possible Approaches To a Solution

In the course of a work shadowing visit in Finland in December 2017, our Finnish partner institution *Tampereen Aikuiskoulutuskeskus* (TAKK) presented its experience of a trial of the *SELFIE* tool. At that point, *SELFIE* had not been released for public use, but the essential idea behind the tool appeared highly promising for our efforts at OSZ IMT.

At the same time, the *Joint Research Centre* (JRC) of the European Commission published its competence framework *DigCompEdu* (Redecker 2017) that defined digital competence among teachers. For the purpose of supporting our school development processes around "Digital Learning and Teaching", a combination of both tools appeared particularly useful due to its close relation with the *DigComp* competence framework, which had been adopted across Germany in the iteration of the KMK strategy *Bildung für die Digitale Welt* (Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland 2016) [KMK=Standing Conference of the Ministers of Education and Cultural Affairs, Federal Republic of Germany, 2016]. The relevant tools, approaches and practical experiences, in particular the self-evaluation tool *SELFIE*, are discussed below.

## 2 EUROPEAN COMPETENCE MODELS AND TOOLS FOR *DIGITAL LEARNING AND TEACHING*

### 2.1 Overview of the Competence Framework in the *DigComp* Series

The *Joint Research Centre* (JRC) published the *Digital Competence Framework for Citizens*, abbreviated as *DigComp*, in 2013. The first version of this competence model describes five competence areas with a total of 21 competences (Ferrari 2013), which in turn are subdivided into three competence levels *A - Foundation*, *B - Intermediate* and *C - Advanced*. The competence framework aims at building a European consensus on basic digital competence of its citizenry to help them participate in their future social and professional lives. The *DigComp* competence framework has met this goal in several respects – the majority of national political institutions have adopted the competence framework and implemented it nationally. Among other functions, the framework also forms the basis for competence as outlined in the strategy „*Bildung in der digitalen Welt*“ by the conference of the Ministers of Education and Cultural Affairs.

Expanding upon the *DigComp* competence framework, the Joint Research Centre (JRC) developed the *DigCompOrg* model (Kampylis, Punie, & Devine, 2015). The model describes various thematic elements for assessing integrative processes and the effective use of digital technology in schools, and defines, for example, the goal to provide appropriate self-evaluation tools for schools. Augmenting the *DigComp* competence framework, which placed its focus on the knowledge and skills of the individual, the *DigCompOrg* model defines the competence and processes in organizations so that they can implement how the competence described in *DigComp* can be gained within the formal context of education.

Both of these competence frameworks are completed through the use of *DigCompEdu*, short for *Digital Competence Framework for Educators*. It defines 22 competences in six areas (Redecker 2017) that cover the activities of learners/students in a digital education

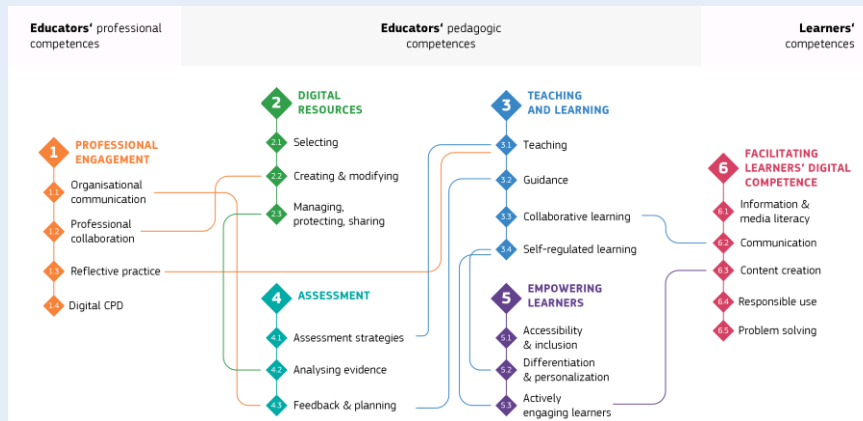


Figure 2: Overview of the *DigCompEdu* Reference Framework.

Source: European Commission – Joint Research Centre

environment. One interesting aspect of this can be found in the cross-references within the framework that refer to mutually supportive or augmenting competences as can be seen in **Fehler! Verweisquelle konnte nicht gefunden werden..** The focus of *DigCompEdu* is not so much on learners' technological competence, but instead on the innovative, deliberated and holistic, pedagogically intentional use of digital tools and media within the professional activities of the teachers.

## 2.2 Competence Framework of the *DigComp* Series as a Basis for School Development in the Digital World

Taken together, the three *DigComp* competence frameworks interestingly enough describe three important areas of the three-way-model by Rolff (2016): with the use of *DigComp* and the strongly related KMK competences for the digital world, the digital competences are defined in terms of learning progress as a reference point for school development; *DigCompOrg* contains the key competences for the targeted development of an organisation in the area of "Digital Learning and Teaching"; and *DigCompEdu* offers guidance for staff development. Thus, it makes sense to consult all three models as the starting point for school development in terms of digitization.

Taking the two competence frameworks *DigCompOrg* and *DigCompEdu* as a foundation, the JRC provided two self-evaluation tools to assist schools in their efforts to integrate digital competence in their organizations. In the fall of 2018, *SELFIE* became widely available that places its focus, following the *DigCompOrg* framework, on the educational institution as a whole. The *DigCompEdu Check-In* questionnaire, intended to measure the individual competence of faculty, is currently only available in a preliminary version to support teachers in "... reflecting on their [...] competence as a teacher and expand on it" (JRC - Joint Research Centre der Europäischen Kommission, 2020).

## 3 SCHOOL DEVELOPMENT MODEL FOR DIGITAL LEARNING AND TEACHING AT OSZ IMT

### 3.1 School Development in the Area of Digitization at OSZ IMT

The departmental structure of the school, introduced in Chapter 1.1 and Figure 1 above, illustrates that a school development process concerning "Digital Learning and Teaching" needs to be able to influence all school leadership levels. The Digital Pact of 2019 served as a change agent in order to include the process, our digitization strategy *IMT DIGITAL 2024*, as a comprehensive pillar in our school program. An iterative, cyclical implementation approach resulted from it (Figure ). Based on the analogy of Rolff's three-way model (2016) with the various elements of the *DigComp* series, as mentioned in Chapter 2, its goal is a much stronger collaboration with other subject fields at OSZ IMT to design the curriculum. At the same time, we need to be sure these can be brought in sync with the organizational steps and the necessary infrastructure measures that will have to be controlled by school management.

### 3.2 Processes and Tools for Designing a Curriculum in Terms of Media Development Plans

The implementation of this iterative model is led by the steering committee *Digitalpakt*. The committee itself regularly discusses and reconciles all steps of the process. To that end, the steering committee consists of representatives from all organizational levels and is in charge of internal communication. A team for *Media Development* will support the committee, assisting in each of the implementation steps and supporting the subject departments in the implementation to help conceptualize the work. The team shall also create and update the digitization strategy *IMT DIGITAL 2024* which also serves as a media concept that meets the sponsorship guidelines in order to draw on funds for the *Digitalpakt* and documents the entire process.



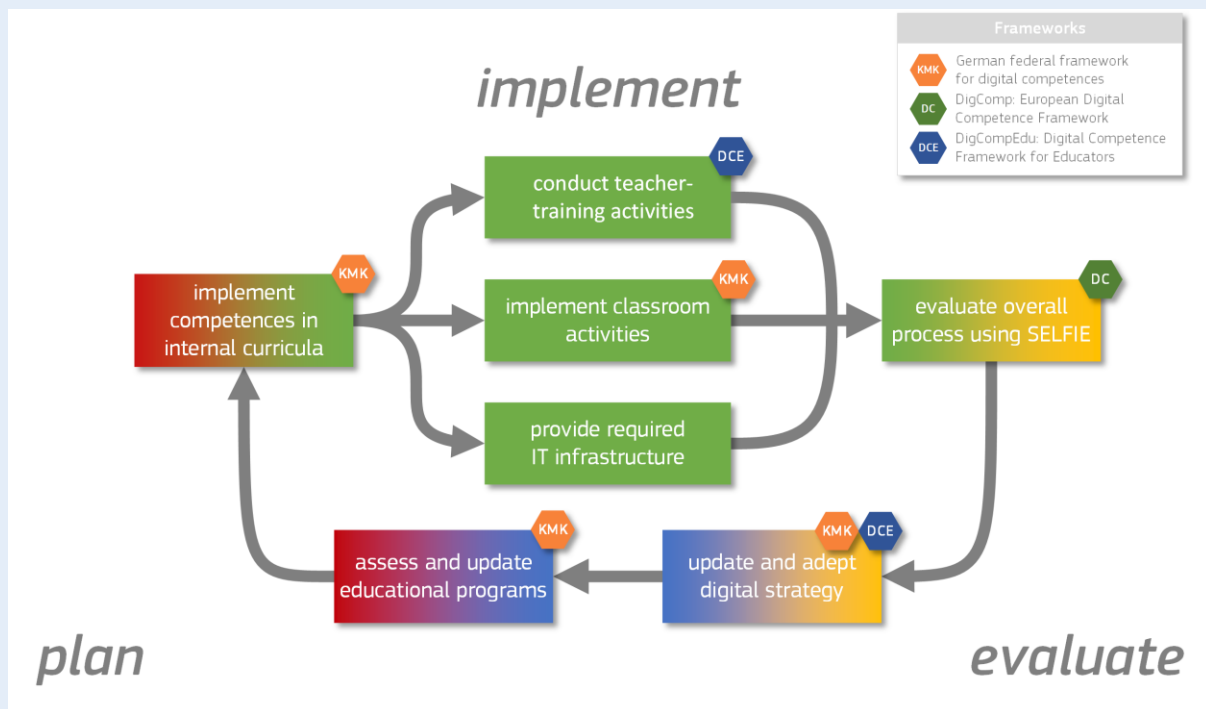


Figure 3: School Development Model for "Digital Learning and Teaching" at OSZ IMT

A key part of the entire process is the use of the *SELFIE* tool to complete the annual evaluation of the "status quo". In each cycle of this process, *SELFIE* is intended as a focal point to support the separate leadership levels each February with a data-based evaluation tool to assess how the process is being implemented and adapted to the continually changing situational demands. At the same time, the evaluation is intended to inspire a reflection on the individual role and the leadership activities in the context of a school-wide development in the area of "Digital Learning and Teaching."

The first evaluation in the spring of 2019 marked the beginning of an iterative, cyclical approach and, consequently, the start of a stronger integration of "Digital Learning and Teaching" in the school development process at OSZ Informations- und Medizintechnik. We will describe and discuss the planning process, execution and assessment of this first evaluation in more detail in the following Chapter 4.

## 4 SELFIE AS A TOOL IN SCHOOL DEVELOPMENT

### 4.1 Functionality of *SELFIE*

According to the authors, *SELFIE* is an acronym of *Self-Reflection on Effective Learning by Fostering the Use of Innovative Educational Technologies*. Analogous to the selfie we can take with our smartphones, the idea behind the tool is to give schools an easy and fast way to take a "snapshot" of their current status in terms of "Digital Learning and Teaching." Schools are able to compile a scientifically validated set of questions in the *SELFIE* portal to produce an online survey of 30 minutes length that is sent out to members of the *school management board*, *teachers* and *students* to capture their viewpoints. The survey aims at shedding light on various aspects of school life from three different angles (European Commission, Joint Research Centre 2020).

The core idea of *SELFIE* includes a regular re-evaluation at different times in order to detect and react to development trends arising out of comparing the results. Therefore, *SELFIE* can be employed, a) to initiate a focused school development process in the area of "Digital Learning and Teaching," and b) to evaluate the process regularly, assessing the efficacy of the actions taken throughout the school.

In its essence, *SELFIE* consists of three parts: a *dashboard* for survey preparation, the three *questionnaires* accessible via an anonymous hyperlink for each of the target groups, and an *interactive results report* that is accessible via the dashboard shortly after the survey closes. The predefined survey items as well as all other elements of the tool have been translated into all official languages of the European Union. A basic set of items is available in the *dashboard* depending on the pre-selected type of school. It is possible to deactivate several other items if they are not applicable to the school. The school is also able to add up to ten school-specific questions, drafted by the school administration.

From the user's perspective, *SELFIE* is a classic survey structured into six to ten sections with statements. Each statement can be rated using a *Likert* scale of 1 (lowest rating) to 5 (highest rating). Each rating on the scale comes with a short description of the corresponding statement (Figure 4). The survey can easily be completed using a smartphone, i.e., no PC workstation is necessary. It can be completed in a regular classroom setting provided the participants are able to use their own smartphones.

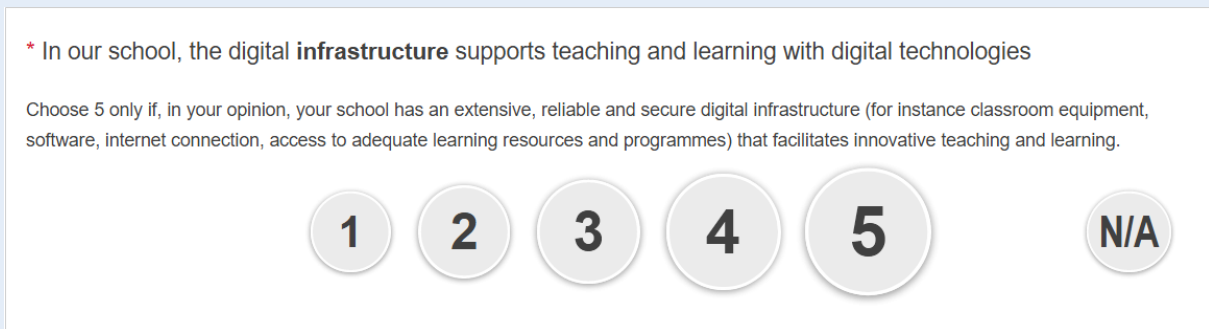


Figure 4: Item B1 "Digital Infrastructure" from the online survey *SELFIE*, teachers' viewpoint

The statements have been rephrased to match the three viewpoints of *school management*, *teachers* and *students*. The evaluation produces an aggregated report separating the items into six categories, i.e., *School Leadership*, *Infrastructure and Equipment*, *Continuing Professional Development* (only members of the school management board and teachers), *Teaching and Learning*, *Assessment Practices* and *Student Digital Competence*. Each item is represented by a mean value, taken from all three viewpoints. You can compare aggregated assessments and open up and show the responses in detail, enabling the detection of different perceptions among the school managers, teachers and students which could then be examined in more detail through the use of other tools for a targeted survey. The following section taken from an OSZ IMT study demonstrates the methodology of a weighted presentation.

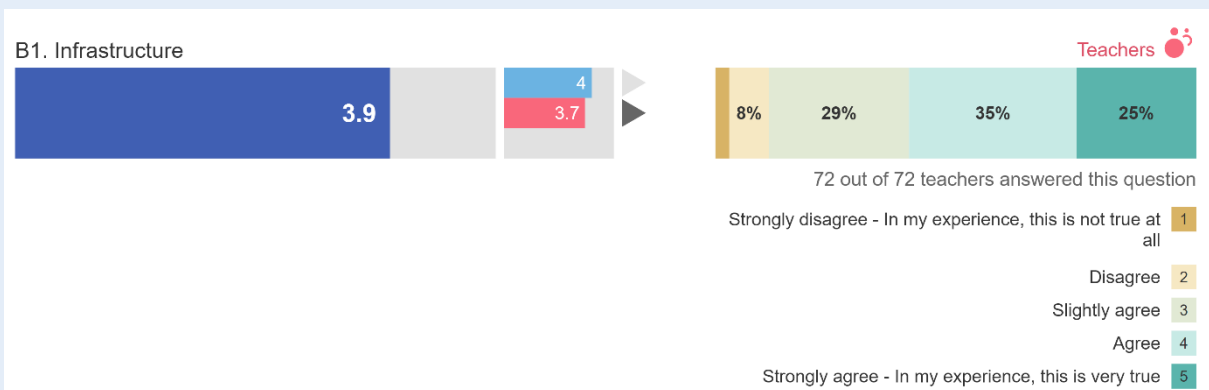


Fig. 5: Excerpt from a results report showing Item B1 "Digital Infrastructure"

The way in which the analysis is conducted already demonstrates that results from a largely qualitative self-evaluation do not allow for scientifically valid conclusions. What the results do provide, however, is a way to identify possible focal points in the "digital school development" and to provide, during a follow-up survey, a way to discover and assess changes when asked to categorize the need for action in school development.

## 4.2 Planning the Survey

During a workshop conducted with our European partner institutions, a core team consisting of department heads, quality managers and project managers developed an initial time frame for the introduction of *SELFIE* as a tool in our school and, at the same time, gain insight into the current state in order to determine the next steps for implementation. The steps listed in Table 1 were implemented in the planning process.

Step	Responsible	When
Inform the expanded school management board	Project Core Team	December 17, 2018
Form a steering committee	Project Core Team	through January 15, 2019
Introduction at a school conference	Steering Committee	January 16, 2019
Define school-specific questions	Steering Committee	through ~ February 15, 2019
Inform the teaching staff	Project Core Team	through ~ February 28
Conduct survey	Teachers	March 25 through April 12, 2019
Analysis and conclusion	Project Core Team	through end of April, 2019

Table 1: Planning the time frame for the *SELFIE* survey 2019

The steering committee, consisting of representatives of the expanded school management board, the conference of department heads as well as the subject department managers and the student body representatives, were primarily asked to assist with the survey during the planning phase and formulate school specific questions together. It was our goal to engage the various groups more deeply and connect with the subject departments early on which had been problematic during the development project "Digital Classroom".

By choosing to count back in time, the core team determined an approximate timeline for the individual steps and assigned tasks accordingly. The survey was scheduled for the last three weeks prior to the Easter holiday (spring break) so we could analyze the results immediately afterwards to discuss them with our school partners in Berlin during a meeting. Conducting the survey in the weeks prior to Easter also meant that we could include the graduating classes as these were still attending classes prior to Easter. Simultaneously, we had access to all classes in dual-track IT training since these trainees were attending school for one week out of the three weeks prior to Easter.

We introduced our timeline as well as the core concept in the weekly school management meeting and met with great support. The school management board also welcomed our approach to engage the subject departments by involving them directly in formulating questions. The decision was then passed on to the school conference and to the data security officer of the school.

In the following planning phases, we discovered during the first meeting of the steering committee that *SELFIE* did not adequately reflect the strong aggregation of the different perceptions within each educational track. Thus, to deduce concrete, detailed actions for each target group within the *SELFIE* format proved impossible. This type of differentiation according to the very disparate types of educational tracks within one school is currently, and unfortunately, not feasible with *SELFIE*. In cooperation with Dr. Ralph Hippe, research assistant at *Joint Research Centre* assigned to this project, we registered another school (general education and undergraduate educational tracks) in the portal as a workaround and were, thus, able to generate a second survey link. We then presented the school-specific items discussed and designed by the steering committee to the individual boards and gathered these items into one shared document.

### 4.3 The Survey and Evaluation of the Results

A critical aspect for the successful use of this tool were high completion rates among all three target groups. To that end, the school principal sent a detailed email message explaining the process to the teaching staff. In addition, I posted the key information on the school's website. The table below shows the survey response rates:

	School Mgmt. Board	Teachers	Students Depts. II-IV	Students Dept. I
Responses	12	72	558	560
Completion	71%	51%	37%	56%

Table 2: Participants in the *SELFIE* survey

Due to the nature of *SELFIE*, it is impossible to limit access by providing codes to participants or personalized links. In order to prevent a falsification of the response through multiple participation or passing the link on to others outside of the school, we were unable to send the link directly to the students or share the link on the learning platform. We, therefore, asked the teachers in an information and feedback sheet to conduct the survey inside the classroom. The sheet included the possibility to provide brief feedback on the content and organizational aspects of the survey, and another feedback form was made available online. The course-

specific feedback enabled specific reminders to individual teachers if no feedback had been received.

During the course of the survey, we captured up-to-date completion rates so that we would be able to intervene if participation were low. The total completion rate can be found in Table 2. Overall, teachers participated within anticipated margins. We noted that several department or subject department heads only participated in the teachers' survey. We were glad to discover that student response rates were very high, particularly from those in Department I, the dual-track IT education.

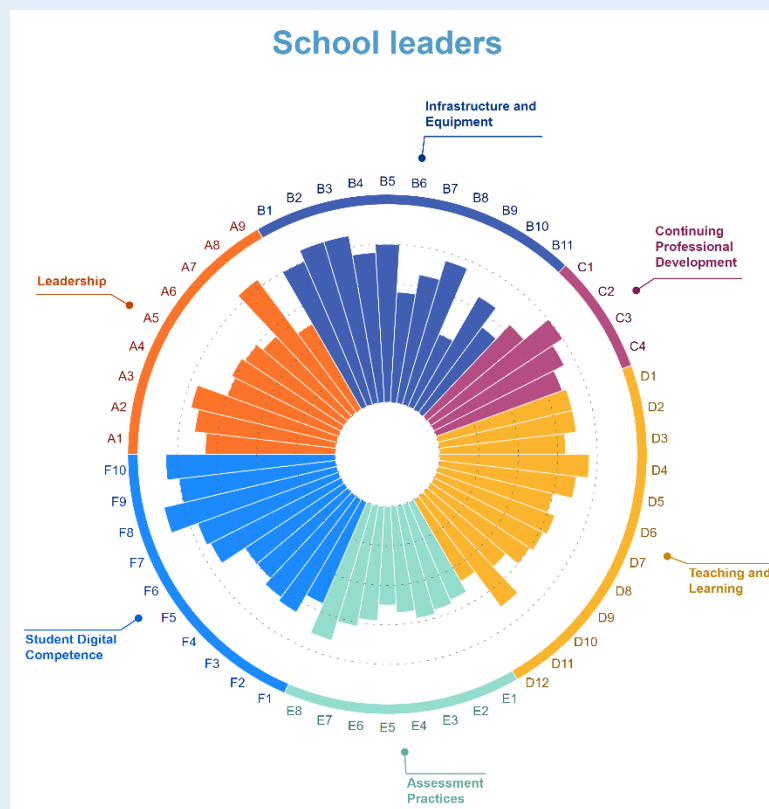


Fig. 6: Circle chart „School Leaders“ from the *SELFIE* response report

In the first analysis of the results, we quickly determined one of the greatest technical disadvantages of the system: while the online report is optimally designed for survey organizers to gain insight into the results – especially the circle chart (Fig. 6) provides a useful overview – there is no way to download a complete report for dissemination to share the results with the teaching staff and the students. The system also does not provide an option to export the aggregated data for post-processing into a spreadsheet or a comparable program. We summarized the charts of some key areas and insights in a PowerPoint presentation in order to show and discuss them. Additionally, we transferred the results manually into a spreadsheet format to facilitate further assessment (Appendix B).

## 4.4 Recommendations for Interpretation of the *SELFIE* Results

Overall, the responses gathered with *SELFIE* produced mostly quantitative results due to the phrasing of the items and the high aggregation of the datasets. For example, one of the items asked whether any virtual learning environments were being used inside the classroom. Whether this is done in a didactically meaningful way, remains unclear. How can we, then, interpret the results as meaningful for school development measures (on a scale from 1 to 5)? We will attempt to discuss this here using some examples from the results. In general, the results of the evaluation using *SELFIE* seem to lend themselves for consideration from three different angles:

- Detect changes between two points in time of evaluation as an indicator for the *efficacy of organizational actions at the school level* in certain intervals
- Emergence of possible *focal points* for development projects and professional development for teachers
- *Reconciliation* of the perceptions of different participants/viewpoints

To assess the *efficacy of organizational actions at the school level*, we can pick a number of items as indicators of the intended effect and observe how the mean value changes. Given that the perception of "Digital Learning and Teaching" can change due to external influences, it might be useful to consider the average shift across all items of those surveyed to assess the presence of bias. Worth considering in that context are the diverse experiences of enforced home schooling during the coronavirus crisis.

As an example, we could combine items B1 *Infrastructure*, B2 *Digital Devices for Learning* with the item, *Student Collaboration*, in section D9: should the availability of devices and infrastructure rise without a corresponding change in D9, the steps at that particular school for integrating collaborative elements into the curriculum should be reconsidered. If D9, however, rises more quickly than B1 and B2, that would point to a change in the teaching process as a not just causal effect of the higher availability of technology. As no results of a repeat evaluation are available at this point, we are unable to examine in greater detail the applicability of this type of correlation.

To determine possible *Focal Points in the Area of Professional Development*, we could choose items showing an overall low rating in terms of the *Mean* among the target groups *Teachers* and *Students*. From the point of the view of the teachers, a subjective deficit exists. The students' point of view presents us with a certain level of expectations since they, too, perceive a deficit. We can deduce this from item E5, and other points, as shown in Table 3.

Teachers			Students Depts. II - IV			Students Dept. I			Students Total		
n	MW	Std.A.	n	MW	Std.A.	n	MW	Std.A.	n	MW	Std.A.
63	2.25	1.13	528	2.19	1.19	532	1.99	1.03	1060	2.09	1.11

Table 3: Results of item E5 *Feedback to other students*  
MW: Mean / Std.A.: standard deviation

Let us take a look at *dispersion* to plan for possible options: if these were items with tendentially *low* dispersion in the responses, it would point to a demand for school-wide development that should be addressed primarily through external incentives.

A high dispersion would indicate that an area needs support with the transfer, i.e., an exchange of *Best Practices* to support the change: a certain segment of teachers appears to have experience in this area and is able to implement it successfully (from the p.o.v. of the students), while other student groups perceive this quite differently. In that context, we must remember that all items target courses as a whole – no differentiation is being made between subjects or educational tracks. We can see this in the results of the item *Use of Virtual Learning Environments* in Section F, as shown in Table 4.

Teachers			Students Depts. II - IV			Students Dept. I			Students Total		
n	MW	Std.A.	n	MW	Std.A.	n	MW	Std.A.	n	MW	Std.A.
69	3.33	1.42	549	3.31	1.20	556	3.49	0.91	1105	3.40	1.07

Table 4: Use of Virtual Learning Environments  
MW: Mean / Std.A.: standard deviation

The results point to significant differences in the use of learning platforms by the teachers. It is also equally clear that the use of learning platforms in the classroom of dual-track IT students is more pronounced than in other educational fields. To increase acceptance of the platform, a knowledge transfer from the teachers in Dept. I to other departments seems therefore advisable.

## 4.5 Usefulness of the Tool and Impact on School Development

In July 2020, we asked the members of the expanded school leadership (school board) for a brief evaluation so we could explore the impact and acceptance of *SELFIE*. To that end, the members were asked to assess the impact of *SELFIE* on the school development processes over the past months and complete the survey statements in Table 5 on a *Likert* scale of 1 through 5 (Strongly disagree ... Strongly agree).



Statement	Mean
I consider evidence-based school development productive.	4.4
<i>SELFIE</i> has helped me to reflect on my role in the area of "Digital Education".	3.6
I sometimes had trouble understanding the <i>SELFIE</i> questions.	1.8
We should implement more tools like <i>SELFIE</i> to evaluate the school development processes.	4.4
I considered the technical implementation of <i>SELFIE</i> appropriate for our target group.	4.6
I consider myself well informed in terms of purpose and timing of the survey.	4.8
The <i>SELFIE</i> team provided sufficient and useful information to the colleagues.	4.6
The time of the survey (three weeks prior to Easter/spring break) was chosen well.	4.2
I would have preferred to have more information about the survey prior to completion.	2.8
The results of the <i>SELFIE</i> survey are useful to me in my daily work.	3.0
While I am unable to use the results for myself, I am aware that others are actively using the results.	3.0
I don't consider the results of <i>SELFIE</i> particularly helpful.	1.8
I am not aware that the results of the survey have influenced the decision making of our school leadership in any way.	2.6

Table 5: Evaluation of the impact of *SELFIE*, members of school leadership surveyed, n = 5

The results show that school leadership considered *SELFIE* a useful tool both in terms of technology and content. Respondents were, however, somewhat indifferent when asked about the usefulness of the results for their daily work. This seems to prove that the inability to export the results from *SELFIE* directly hampered a more intensive actionable use of them. Furthermore, more emphasis should be placed on a presentation of the results following the next survey. During the evaluation, all respondents considered a presentation of the results in one session as helpful, and 60% of the respondents stated that a graphical summary of the results was also helpful.

The various comments entered in response to the two open-ended questions confirmed that the *SELFIE* results were primarily being used as a guideline for strategic decisions at a school-wide level. Lacking, however, the ability to extrapolate information for specific educational tracks or departments, the results proved to be too generic to generate concrete actions, for example, for the work inside individual subject departments.

## 4.6 Conclusion

Overall, *SELFIE* is a useful tool to discover a need for continuing professional development and to set focal points within our digitization strategy. We used the results for our internal continuing professional development during the school year 2019/20 to prioritize tools for digital feedback, such as an assessment system within our internal Moodle system.

Attempting to gain insight with *SELFIE* into the competence among teachers as well as students was, however, not possible even though this type of information is considered desirable by both the school leadership for improved professional development planning and by the department heads for curricular planning. To that end, we will have to find additional tools and implement those in our process. To be able to assess the competence among teachers, observation sheets, for example, for in-class units or a qualitative analysis of existing courses in our learning platform could be useful tools. Building on this analysis, we could then match it with planned content from the internal school curricula. Corresponding digital competence grids could be placed in our learning platform to assess student competence, tying them to single learning activities in the courses.

The biggest technical disadvantage of *SELFIE* remains its vastly reduced functionality for data export. It makes statistical analysis of correlations next to impossible. Our ability to select datasets from specific educational tracks or school years would be pivotal for us, something that is currently not possible. According to Dr. Ralph Hippe, who is in charge of the project, a relevant export is being planned. Another version of *SELFIE*, currently in the first Beta phase, includes a fourth perspective, that of employers, who are partnering with us for vocational training, which could be implemented primarily for cooperation with the vocational training site. According to the latest information, OSZ Informations- und Medizintechnik is one of 15 German schools to join the trial across Europe of this new version in the fall of 2020.

### *Conducting the Survey at OSZ Informations- und Medizintechnik*

Overall, the process showed that the timing and the duration of the survey had been chosen correctly. Ample time for preparation proved necessary to be able to involve the committees as we needed to involve the school conference, for example, which only meets four or five times during the entire school year.

For the upcoming survey period, we see the greatest potential for improvement in the analysis and publication of the results – while we were able to incorporate the most important insight in our school development, passing on the data was extremely cumbersome due to the technical output of the results as they were being presented to us. A better means of access could vastly improve integration as school development depends by definition on communicating developmental processes and synergies between individual fields and sub-departments. We have summarized an assessment of the individual aspects and suggestions for improvement in table 6.

Aspect	Possible Improvement
o Data analysis	Manual transfer of data into spreadsheet, alternatively, changing technological platform
o Involving teachers in the survey	Re-think timing of survey, define interaction, integration with other processes
++ Direct contact with <i>SELFIE</i> team	
- Involving subject departments	Invite a speaker/rep of the subject departments
++ Involving school leadership	
+ Info sheet to teachers	
+ Informational webpage	Screenshots of the app, our own screencast to replace official video
+ Feedback	Offer online form to students for direct feedback (circumventing teachers)
+ Steering committee to select questions	Create a test run at a "theoretical school"
- Publish the results	Present summary to a general conference
++ Actions over time - planning	

Table 6: Possible areas of improvement for conducting *SELFIE*

### *Comparative Assessment with other Survey Tools*

Aside from the benefits and disadvantages of the tool described above, the relatively simple, quick use of the online portal and the solidly developed set of items were an obvious advantage. During previous surveys we had used much more complex surveying systems (*SociSurvey*, *LimeSurvey*). While offering stronger, more expansive possibilities for analysis, these options proved too unwieldy to generate and analyze. It was helpful in this instance to be able to transfer the data from the online report into a spreadsheet to evaluate the results further, i.e., consider standard deviation, and to be able to redirect the results internally in a more condensed format.

An alternative option could be to conduct the survey using the set of items with another surveying solution. Since the set of items is covered by the EU Directive 2011/833/EU, re-use should be permissible without any legal implications. Technically, the survey could be handled by our learning platform *Moodle*, or by posting the questionnaire to the self-evaluation platform SEP of the *Institut für Schulqualität der Länder Berlin und Brandenburg* (ISQ BB).

## 5 SUMMARY AND CONCLUSION

As far as using *SELFIE* as a tool is concerned, the results have indeed worked their way into our practical application of school development. It, also, became clear that *SELFIE* is indeed a suitable tool for accompanying ongoing processes in the area of "Digital Learning and Teaching". Only the analysis of a second survey will show the mid-term success of specific actions following the *SELFIE* results. From the perspective of those involved in the school development process, we are able to confirm that implementing and using European tools as a guideline to assess and systematize digital competence in support of institutional as well as individual actionability are particularly effective when these can be evaluated incrementally and repeatedly at both the teachers' as well as the school leadership level.

It remains to be seen how a more concentrated usage of *DigCompEdu* would hold up as a baseline for an individualized continuing professional development concept when put into practice. What we were, however, able to confirm in our daily handling of school development is that the usage of common terminology when referring to the competence areas and characteristics of *DigCompEdu* presents a strong benefit in designing the appropriate profession development plans. This is particularly true when it comes to inter-institutional cooperation at the local as well as the European level.

Taking this approach, it is possible to introduce sustainable change and control it systematically through the expansion of existing learning management systems and a professional development format that is customized in small steps to the individual competence of each teacher. In that manner, we will be able to achieve a holistic school development for the digital age.

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