



Research paper

Teachers' attitudes towards and perceptions of diverse practices of differentiated instruction

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ABSTRACT

General and special needs teachers in Austria and Switzerland met four times locally and three times binationally to develop their inclusive teaching. Based on video clips of their own lessons, differentiated instruction (DI) practices were discussed. The twelve teachers were interviewed to find out more about their attitudes towards DI practices. A mixed-methods research design was employed to investigate the occurrence of DI practices and the extent of consistency in attitudes and perceptions regarding DI. This study examines the theoretical assumption that attitudes guide teachers' perceptions. Six major groups of DI practices were identified: DI of content/goals, learning time, material, open education, individualisation, and individual support. Given the frequency with which these practices were observed, it became evident that there were specific differences between countries. Across all practices, it was evident that the frequency of DI practices, as observed in the interviews and perceptions, showed a considerable degree of consistency.

1. Introduction

Although much is being done in German-speaking countries to promote inclusive teaching, there are still difficulties in specifically implementing relevant professional development (PD) measures (Gebhardt et al., 2015). While inclusive education is a key objective of education in Germany and Austria, Switzerland is more cautious and has formulated an approach of integrating as far as possible. At present, inclusive education is under pressure in Switzerland and politicians are once again calling for more special classes. Special classes still exist in Austria, although the proportion varies from region to region. In both regions, teachers report fears of being overworked in addition to difficult working conditions (Gebhardt et al., 2015; Sahli Lozano et al., 2025). Furthermore, they have unclear ideas about what inclusive teaching could look like in practice.

Inclusive teaching, in short, is about how all children – those with and those without special educational needs (SEN) – can be taught together. Inclusive teaching that promotes learning is more than just being together socially in the same classroom. A promising teaching approach that aims to meet students' individual learning needs by maximizing educational opportunities is differentiated instruction (DI) (Gheysens et al., 2021). Tomlinson (1999) developed a model of DI in which the learning content, the learning process, and the learning

product can be differentiated. This model was adapted and extended by Pozas and Schneider (2019), resulting in six categories of DI. Their study shows that these categories differ in the frequency with which they can be observed in the teachers' classrooms. One explanation for this finding could be related to the teachers' attitudes towards DI. Teachers with positive attitudes towards DI are more likely to adapt their instruction to meet individual student needs and to have a more favourable approach to inclusive education (Gheysens et al., 2021).

According to Blömeke et al. (2015), teachers' dispositions affect teacher interactions in the classroom indirectly via teachers' perception skills, also called *professional vision*. Professional vision describes teachers' ability to notice and interpret classroom events that are relevant to the process of learning (van Es & Sherin, 2002). What we do not yet know much about is the professional vision of teachers in inclusive classrooms and what they notice regarding DI practices (Gheysens et al., 2021; Seidel & Stürmer, 2014). Furthermore, it has not yet been empirically clarified whether relationships between dispositions and perception skills can be demonstrated with regards to inclusive teaching. Therefore, we used two different methods to gain insight into teachers' thinking about DI practices. On the one hand, this was done through the discussion of recorded lessons in PD sessions. We based our approach on the concept of video clubs as proposed by van Es and Sherin (2002). The aim was to identify which aspects of DI teaching teachers put specific

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emphasis on. On the other hand, we conducted interviews where we asked about their implementation of DI practices. In doing so, we addressed the behavioural component of their attitudes (Haddock & Maio, 2008), for example, whether it is important to create a welcoming classroom environment for students with mild to moderate disabilities (Gregory & Noto, 2018). The term "practices" was conceptualised as systematic behavioural patterns employed to address recurring pedagogical challenges within specific instructional contexts (Brungs et al., 2023).

To summarise, the following study initially analysed how often the six categories of DI appeared in the interviews and discussions. Secondly, it was examined whether teachers' attitudes and perceptions of DI practices in video clubs were thematically consistent. The intention of that investigation was to determine whether there were any differences that indicated, for example, challenges in implementing specific DI practices.

2. Theoretical framework

2.1. Differentiated instruction

DI is an educational approach designed to tailor teaching methods and learning experiences in order to accommodate the diverse needs, interests, and abilities of students within a classroom (Tomlinson et al., 2003). This instructional strategy recognizes that students vary in their readiness levels, learning profiles, and interests, necessitating a flexible approach to teaching that can engage all learners effectively (Tomlinson, 1999). The core philosophy of DI is grounded in the belief that effective teaching must respond to the unique characteristics of each student, rather than adopting a one-size-fits-all methodology (Dixon et al., 2014). In the context of inclusive education, DI serves as a critical framework for addressing the unique challenges posed by diverse classrooms (Lindner & Schwab, 2020). The terminology of DI differs in the various studies on DI, partly depending on the country, but it is generally assumed that DI practices are pedagogical measures in the common classroom (Eikeland & Ohna, 2022; Graham et al., 2021; Hu, 2024).

Few studies report on the impact of DI for learning, but overall, there seems to be a neutral to positive effect of DI for academic subjects, reading skills or engagement (Graham et al., 2021; Hu, 2024). To make DI as effective as possible, a few aspects need to be considered. For example, assessment should be used to optimise instruction to the level of the students (Smit & Humpert, 2012; Tomlinson, 1999). The teacher plans the design and implementation of DI on the basis of previous and ongoing formative and summative assessment (Tomlinson & Moon, 2013). It is also essential to create a respectful and protective learning environment in which the needs of all students are met (Tomlinson, 1999). When students work in individual groups on different tasks, it requires a little more organisation than when the class is facing the teacher in a frontal arrangement. Therefore, good classroom management can help teachers to implement DI in an organised way (Subban & Round, 2015).

In many empirical studies, especially quantitative ones, DI is summarised into an all-encompassing construct that is measured using one single scale (Wertheim & Leyser, 2002). When we look, however, at how teachers implement DI in the classroom, we see a wide range of practices and what is needed is rather a broader measurement of the construct. These practices are not brand new forms of teaching: they have already been described in early literature such as Hootstein (1998). Many studies refer to the categories of practices outlined by Tomlinson (2001), who differentiates content, process, and product, each of which can be further differentiated depending on the readiness, learning profile, and interest of students (Gheysens et al., 2020; Hall, 2002; Santamaria, 2009; Smets & Struyven, 2020).

In 2019, Pozas and Schneider undertook a comprehensive review of existing literature in order to develop a taxonomy of differentiated

instruction practices. The practices described in each of their six categories serve specific purposes of instruction or individual teachers' preferences. They distinguished the following practices of DI: tiered assignments, composition of student groups, tutoring systems, learning aids, mastery learning, and open education. As Pozas and Schneider (2019) emphasise, practices from these six categories can be combined in the classroom to further enhance the impact for learning. The frequencies of these categories might differ in inclusive and non-inclusive classrooms as a study conducted in Mexico has demonstrated (Pozas et al., 2023).

These categories of DI include more spontaneous forms, but also longer, more elaborate ones (Smit & Humpert, 2012). With reference to the work of Randi and Corno (2005) on students' individual differences and adaptation of instruction, one could distinguish between categories of practices that are more teacher-guided and such that are more self-organised (Fig. 1). For example, the category open education is associated with granting greater autonomy on the part of the learner (Lee & Hannafin, 2016; Wulf, 2019). More guided practices, where students are supported with additional and often individual help, are less time-intensive in preparation and implementation for the teacher. Other practices, where tasks are more complex or where practices stretch over a longer period, need to be planned well in advance. Also, their implementation is more difficult, as students require more self-regulation (Garrett, 2008; Tomlinson, 1999). In this respect, these categories of DI practices can also have different effects on the learning success and motivation of individual learners. In the same class, different practices may be useful, depending on the characteristics of the learner(s). In the discussion, we will return to Fig. 1 to discuss why certain DI practices are used more frequently than others.

Only a few studies explore the relationship between teachers' attitudes towards DI and their implementation of it. In a study by Suprayogi et al. (2017) teachers with higher constructivist beliefs reported higher implementation of DI. Letzel et al. (2023) conducted a cluster analysis, finding that teachers who value DI report practising DI more often than those who feel challenged by DI and those who do not value DI much. This points out that a considerable number of teachers might see DI just as an additional workload, a complication of teacher's work, or even as detracting from students' achievement, in that it lowers the demands on students (Graham et al., 2021).

2.2. Teachers' noticing in video clubs

Teachers must constantly notice what is happening in the classroom and take appropriate action accordingly. The construct of "noticing" represents a fundamental component of teacher expertise and exhibits substantial theoretical overlap with the concept of professional vision (Keskin et al., 2024). While operational definitions of these constructs demonstrate some variance, they consistently encompass two primary cognitive processes: selective attention and knowledge-based reasoning (Santagata et al., 2021; Sherin & van Es, 2009). Within our theoretical framework, noticing is operationalised as educators' capacity to identify salient classroom events, interpret observed pedagogical interactions, and formulate evidence-based decisions regarding alternative instructional strategies (Kaiser et al., 2015).

Research has demonstrated that video-based observation and reflection protocols in PD interventions enhance teachers' meta-cognitive awareness of their pedagogical practices (van Es, 2012). Analysis of attentional patterns during video observation reveals that teachers' perception focuses predominantly on teacher behaviours, which present the most accessible behavioural data (Sherin & van Es, 2009). Longitudinal investigations of video club participation by Sherin and Han (2004) document progressive development towards more nuanced analysis of student learning processes, indicating a shift in observational focus from teacher to student behaviours. However, empirical evidence demonstrating the impact of noticing-focussed PD on instructional quality remains limited (König et al., 2022). Moreover, the

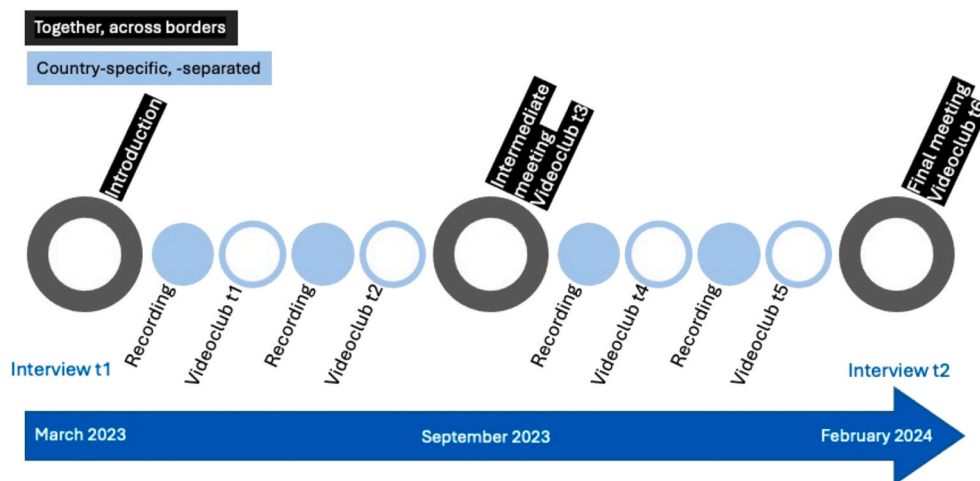


Fig. 2. Research design.

The analytical framework consisted of qualitative coding of video club discourse and interviews. The coding information derived from qualitative sources was converted into numerical values for further statistical analysis. Specifically, categories were counted, and absolute and percentage frequencies were determined. To test differences between the countries, a quantitative analysis of coded segments was conducted. This mixed-methods approach facilitated both depth of understanding and statistical validation of observed patterns (Tashakkori & Teddlie, 2010).

The two countries involved in the study can be compared well in terms of the possibilities for integrating children with special educational needs (SEN), although there are some specific nuances. For example, in both countries about half of the children with SEN are taught separately, while the other half are taught inclusively in regular classes (Biewer, 2023; Bula et al., 2019). Specifically for Switzerland, school authorities in certain cantons can decide for themselves whether or not to offer inclusive classes. By contrast, in Austria there are no special classes, only either special schools or inclusive classes. In addition, in Switzerland the SEN teacher in inclusive classes is often limited to a few hours, whereas their counterpart in Austria is usually present in the classroom throughout the week. In both countries, German as a second language (DaZ) is officially considered a support need.

3.2. Sample

The project managers in each country personally contacted the head teachers in the two neighbouring regions of each country to find a potential school for the project. In Switzerland, this took a long time, although the teachers were promised compensation for participating in the video clubs. The sample comprised three teacher tandems per country ($N = 12$), each consisting of one special education teacher and one regular schoolteacher. All but one of the teachers were female. Their professional experience ranged from four to over 20 years. In Switzerland, the number of pupils ranged from nine to 21. These pupils were either in mainstream classes in Grades 1–4 or in special education classes with mixed grades. Between four and 11 pupils per class needed special support and/or DaZ. In Austria, there were between 13 and 24 pupils per class and the pupils were either in Grades 1–4 or 5/6 mixed. Of these, up to three pupils per class had support and/or SEN, and up to 11 pupils had DaZ; not every class necessarily had a pupil with support and/or SEN, and not every class necessarily had a pupil needing DaZ. The recruitment and survey process followed the guidelines of the internal ethics committee. Consent for filming was obtained from teachers and parents of students.

3.3. Data collection

To optimise participant engagement while minimising time constraints, the protocol included four localised sessions, each scheduled to follow their school lessons, complemented by three extended binational meetings. Three tandems (regular teacher and special needs teacher) each met in a video club locally. An initial session served as a methodological orientation. Qualitative attitudinal data were collected through pre- and post-group interviews, scheduled for subsequent analysis. The group interviews lasted approximately 30 min and were conducted for each country group separately. Open questions aimed to stimulate discussion and were asked twice in more or less identical form. The interview protocol can be found in the appendix. Teachers were asked what they understood by inclusive teaching and how they dealt with heterogeneity in the classroom in practice. The latter implicitly includes the question of how they believed differentiation was best implemented. Behavioural attitudes are difficult to capture. Such behavioural attitudes can be made accessible by implicitly asking about behavioural practices (Nisbett & Wilson, 1977).

The methodological procedure involved systematic classroom observations of co-teaching dyads (general education and special education practitioners). Video documentation of these sessions underwent independent analysis by two researchers to identify critical incidents, particularly focusing on opportunities for optimising student learning outcomes and interprofessional collaboration. Through shared impressions within the research team, three salient video segments were selected for each session. During video club meetings, participants engaged with two to three extracted segments. These pre-recorded clips of the partner country were used in the binational sessions for perceptions of the other group.

In order to make the research settings comparable, the teachers in Switzerland were instructed to try out a form of team teaching. They were asked to teach in tandem and to conduct a lesson with two classes in a mixed way (e.g., a special class and a regular class in Grade 1). This resulted in greater heterogeneity in the classes and more topics for discussion in the video clubs.

The results were presented and discussed in a final meeting. This served to acknowledge the participants' contributions and also to validate the results.

3.4. Data analysis

In the analysis, we identified six groups of DI practices, slightly adapted from the categories of Pozas et al. (2019), including 14 subcategories. The main categories and subcategories are described in

Table 1
Main categories and subcategories of DI.

Main category	Subcategory	Description and sources	Anchor examples
DI of content/goals, tiered instruction: refers to differentiated approaches in terms of content or goals	Level groups	Establishing decidedly homogeneous subgroups “based on performance, readiness, interests, etc.” (Pozas & Schneider, 2019).	“Because the small children have a motor task, they are kneading something, so they don’t have to concentrate so hard on what they are doing. But for the older children, I find it very challenging to stay focused” (CH_V6_Pos. 27) “The book is now presented again. And when it is finished, the third and fourth grades are sent to their seats with the worksheet. The second and third grades go to their seats with the worksheet and look for the words. And Kerstin offers the first graders separate help; they remain seated.” (AUS_V4, Pos. 77)
	Adapt level	Adapting teaching beyond the average performance of the class (Corno, 2008); undifferentiated adaptations such as consideration of stronger and weaker students, without further explanation; unspecified reduction or expansion of learning content for class or groups.	“But the distraction is automatically not as great in the year group because we are working on roughly the same thing, but perhaps in different ways, not at the same level of difficulty” (CH_V6_Pos. 46) “We have grades 1 to 3 across all age groups. So there is already a lot of differentiation. It’s hardly noticeable when there is further differentiation for two children. For some things, they participate in the first grade. For other things, they participate in the second grade.” (AUS_I1_Pos. 21)
	Basic knowledge	Providing additional knowledge for one group while the other group sticks to the basics. The aim is for all pupils to acquire at least basic skills (Pozas & Schneider, 2019).	“Everyone who goes to secondary school needs this. We practise it with them. And the others, who we know will have little contact with it, should hear about it. They should know that

Table 1 (continued)

Main category	Subcategory	Description and sources	Anchor examples
			it exists.” (AUS_I2_Pos. 54) “We still have that. Because we put it together at the last minute. Because we realised that the student had no idea what it was. So we’re going back to the basics for this student.” (AUS_V5_Pos. 94) “In my case, I always have additional work to do in handicrafts, and this work always corresponds to the topic or is expanded in line with the technique or skills.” (CH_I2_Pos. 17) “And then we’ll see who is already further along so that they can do the extra work.” (CH_I2_Pos. 37)
DI of learning time: refers to differentiated approaches in terms of learning time	Additional tasks	Providing additional tasks for fast or more competent pupils to bridge the time until the class as a whole continues to work again (Smit & Humpert, 2012).	“We don’t always just have the fill-in-the-blank texts in the book, sometimes more difficult ones, sometimes for faster (pupils) and sometimes for slower ones, that’s the classic approach, for fast and slow learners.” (AUS_I2_Pos. 26) “Afterwards, there was no longer a situation where the two of them could work at their own pace, right? I think that was relatively close to the end of the lesson, right? Actually, the time ran out at some point and some of the children may have finished, while others didn’t quite finish.” (CH_V4_Pos. 131)
	Adapt time	Allowing pupils to work at their own pace; e.g. slower or less competent pupils are given more time to complete their tasks (Smit & Humpert, 2012).	“That might also be a possibility, right? That the same text (is used), but simply in capital letters, because some people, for example, did not
DI of material: refers to differentiated approaches in terms of material	Differentiated tasks	Providing “qualitative and/or quantitative variation of materials and tasks according to challenge level, complexity, outcome, process,	

(continued on next page)

Table 1 (continued)

Main category	Subcategory	Description and sources	Anchor examples
	Open tasks	product, and/or resources” (Pozas and Schneider, 2019). Selecting tasks and assignments that are formulated in such a way that they can be completed at different, self-selected levels of difficulty (Smit & Humpert, 2012; Tomlinson, 1999).	yet know all the upper- and lower-case letters” (CH_V1_Pos. 70) “I’m thinking about making simpler and more difficult worksheets for the stronger and weaker students” (CH_I2_Pos. 13) Teacher_1: The task was still very oral. Nothing had been read yet. It is somewhat differentiated because each child contributes the word they know. (...); Teacher 5: It is a task that all children can solve. All three children can solve it. (CH_V2_Pos. 53) “I read another picture book this morning. That’s when inclusion happens right away. I read aloud. If the picture book is good, the text matches the pictures. Then those who don’t have such a large vocabulary can compare right away. The others just look at the pictures because they have auditory difficulties. But everyone sits together, and we have an experience together. It’s exciting, even though not everyone is at the same stage of language development.” (CH_I2_Pos. 21) “For me, it also starts with different learning types. When I reflect on the lesson afterwards or correct things and see, hey, that didn’t work, why didn’t this child understand it, how do I need to change it? Do I need to work more visually, or would an auditory
	Learning types	Selecting tasks that are formulated in such a way that several access options exist, e.g., visual, auditory, read/write, or kinaesthetic (Landrum & McDuffie, 2010).	

Table 1 (continued)

Main category	Subcategory	Description and sources	Anchor examples
Open education, student-centred learning: refers to granting autonomy to pupils; “pupils are responsible for their learning process and may autonomously decide on materials to work upon” (Pozas et al., 2019, p. 81)	Station work	Providing assignments at different stations that groups of pupils work on in rotation (Pozas & Schneider, 2019).	approach be better? Or how can I adapt it so that the child absorbs the material?” (CH_I1_Pos. 13) “... you could say that they appealed to a certain type of learner. And the children who perhaps didn’t understand the word can read it again later, right? And those who can’t see it properly in the picture can touch it again later.” (CH_V2_Pos. 97) “So the stations were the white ones for everyone, grammar. The blue station was AHS, because that’s how you differentiate from the second year of secondary school onwards. And the yellow station. (...) Basically, that’s how schoolwork is always divided up. That’s one part for everyone.” (AUS_V5_Pos. 32) “Sometimes stations, so I have certain stations, and certain children don’t have to do all the tasks. Or because tasks that are too difficult for the children are then removed, so that there is also something for the stronger ones.” (CH_I2_Pos. 16)
	Weekly plan	Working with a teaching model in which pupils “work independently and self-directed on content within a specific time frame—usually a week” (Pozas & Schneider, 2019).	“Weekly plan for spelling, that’s one or two exercises for each day, on different topics, which are structured. (...) it also requires self-control, so they control it themselves” (AUS_I2_Pos. 50). “I also like weekly plans, but it’s very much a case of working through things; you get through them quickly, but in the end, when you

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Table 1 (continued)

Main category	Subcategory	Description and sources	Anchor examples
	Project work	Establishing groups that independently process a task or problem, from planning to realisation and presentation of the result (Heard, 2020).	look at what has stuck, it's very little." (CH_V6_Pos. 46) "Or you can do a project. Last summer, we did the garden project. They were simply given different tasks. They did what they were good at. And it actually worked very well. Everyone had something to do. And in the end, it was their work." (CH_I1_Pos. 47) "I'm curious to see how this works. The reading project with the presentations. And this is a classic text, and you need the background information to even understand the content of the text, working more independently in groups. So there were the presentations. And I think they break the content down to their level anyway. And depending on the group dynamics, who does the presentations together, one person contributes more, the other less. And I think that will sort itself out." (AUS_I2_Pos. 32)
Individualisation		Ensuring that every child can learn at his or her own level, e.g., customized tasks, individual support plans (Landrum & McDuffie, 2010).	"Every child is working on something different anyway and everyone is at their own level" (AUS_I2_Pos. 8) "Then we have pupils who we need to supervise on a one-to-one basis. [...]. This means that we downgrade the tasks for them and simplify everything so that it is solvable for them." (AUS_I2_Pos. 58).
Individual support: Refers to support for specific	Additional explanations	Providing verbal learning aids in the sense of scaffolding	"A girl who speaks German as a second language

Table 1 (continued)

Main category	Subcategory	Description and sources	Anchor examples
individuals provided by teachers or peers		(Pozas & Schneider, 2019).	answered incorrectly. (.) She didn't understand the words "result" and "solution". I explained to her what I meant." (CH_V5_Pos. 84). "The explanation phases may be shorter for some children, while others stay with me in the circle a little longer." (CH_I2_Pos. 15) "Some have now taken the sheets. A few, however, have not taken any. He has opted for the counting frame. (...) There are various materials available to help." (CH_V5_Pos. 131) "... some children need more support, especially in the second grade, but now everyone is able to work without a dictionary." (AUS_V4_Pos. 106)
	Additional aids	Providing non-verbal learning aids that help to break down barriers (Pozas & Schneider, 2019).	
	Tutoring	Establishing tutoring systems within a learning group, e.g., "high ability students take up the role of teacher assistants and tutor low ability students" (Pozas & Schneider, 2019).	"And you decided beforehand who are the strong children and who are the weak children. And then there's a ranking list. 18 children in the class. From 1 to 18, and then the strongest child and the child in the middle (.) always work together. And the stronger child is the coach. [...]. It's not the best pupil and the weakest pupil." (CH_V4_Pos. 19) "... that better pupils explain terms to weaker pupils, especially in German, or share their examples with others." (AUS_I1_Pos. 27)

Notes: There are no subcategories for "Individualisation".

Table 1. Regarding the subcategory "learning style" there is no conclusive evidence in research that differentiating approaches would improve student learning (Graham et al., 2021, p. 164). Nevertheless, this category was added to the coding manual because it was mentioned in the interviews and video clubs of our study.

The aim was to achieve intercoder reliability (ICR) between two project members. To this end, a coding manual was created by one member, and a joint coding training session was held with the two coders. Afterwards, three separate test codings were carried out, followed by calculating the Cohen’s κ (Brennan & Prediger, 1981), discussing non-matching codes and amending the coding manual in each case (Bingham, 2023). An acceptable ICR (Cohen’s $\kappa = .67$) was achieved after the third test coding. Subsequently, the coding of the rest of the material was carried out by one project member, and uncertain codes were discussed between the two members in the interests of intersubjective comprehensibility (Cascio et al., 2019).

Two quantitative methods were used. On the one hand, a correlation analysis was carried out to establish the relationship between category frequencies in the interviews and video clubs. On the other hand, a chi-square distribution test was employed in order to ascertain whether the total frequencies of the DI practices (interviews and videos together) that occurred in the two country groups differed significantly from an expected equal distribution. The observed frequencies were then compared with the expected frequencies, and deviations in the distributions were checked.

In the results, statements made by teachers are supplemented by information on the country, an identification number and the line in the transcript. For example, (AUS_I2, Pos. 8) would mean the Austrian group (AUS), in the 2nd Interview (I2) in Position 8 (Pos. 8).

4. Results

With regard to Research Question A, of how often the categories were mentioned in the interviews in Austria and Switzerland, Fig. 3 demonstrates that teachers most often mentioned the categories “Individualisation” (N = 8), “Weekly plan” (N = 7), “Adapt level” (N = 5), “Open tasks” (N = 5) and “Tutoring” (N = 5). They least frequently mentioned “Station work” (N = 1). Generally, this reveals that teachers mostly consider differentiated approaches regarding assisting pupils individually, granting them autonomy, adjusting the levels for the children and establishing learning opportunities where high-ability pupils support low-ability pupils. The following two statements were

mentioned for example in the category “Individualisation”: “Every child is working on something different anyway and everyone is at their own level” (AUS_I2, Pos. 8) and “Then we have pupils who we need to supervise on a one-to-one basis. [...]. This means that we downgrade the tasks for them and simplify everything so that it is solvable for them” (AUS_I2, Pos. 58). This demonstrates that pupils should receive not only content and materials tailored to their level but also individual support. As far as the category “Weekly plans” is concerned, one teacher in Austria mentioned a “weekly plan for spelling, that’s one or two exercises for each day, on different topics, which are structured. (...) it also requires self-control, so they control it themselves” (AUS_I2_Pos. 50). This sentence reveals that, apart from receiving individual support, part of DI is that pupils should also take responsibility for their own learning process.

Regarding Research Question B, of what DI practices mainstream teachers and special needs teachers in Austria and Switzerland noticed in the video clubs, Fig. 4 shows that the categories most often noticed are “Tutoring” (N = 13), “Weekly plan” (N = 12), “Level groups” (N = 11), “Additional explanations” (N = 11), “Station work” (N = 10) and “Differentiated tasks” (N = 9). The categories least mentioned are “Learning types” (N = 1), “Project work” (N = 1), “Additional tasks” (N = 2) and “Individualisation” (N = 2). Overall, these findings demonstrate that teachers not only often discussed groups or dyads in which stronger pupils can support the weaker ones (“Tutoring”) but also mentioned homogeneous groups (“Level groups”). Moreover, they often noticed granting autonomy to students by employing weekly plans and station work, support of pupils by providing additional explanations and a qualitative and quantitative variation of the materials according to the pupils’ levels (“Differentiated material”). They infrequently noticed project work, varying content or materials regarding learning types, providing additional tasks for faster students or assisting pupils on a personalized level (“Individualisation”).

One way that tutoring was employed in Switzerland was by creating a ranking list and putting together the strongest child with the child in the middle, as can be seen in the following statement:

And you decided beforehand who are the strong children and who are the weak children. And then there’s a ranking list. 18 children in

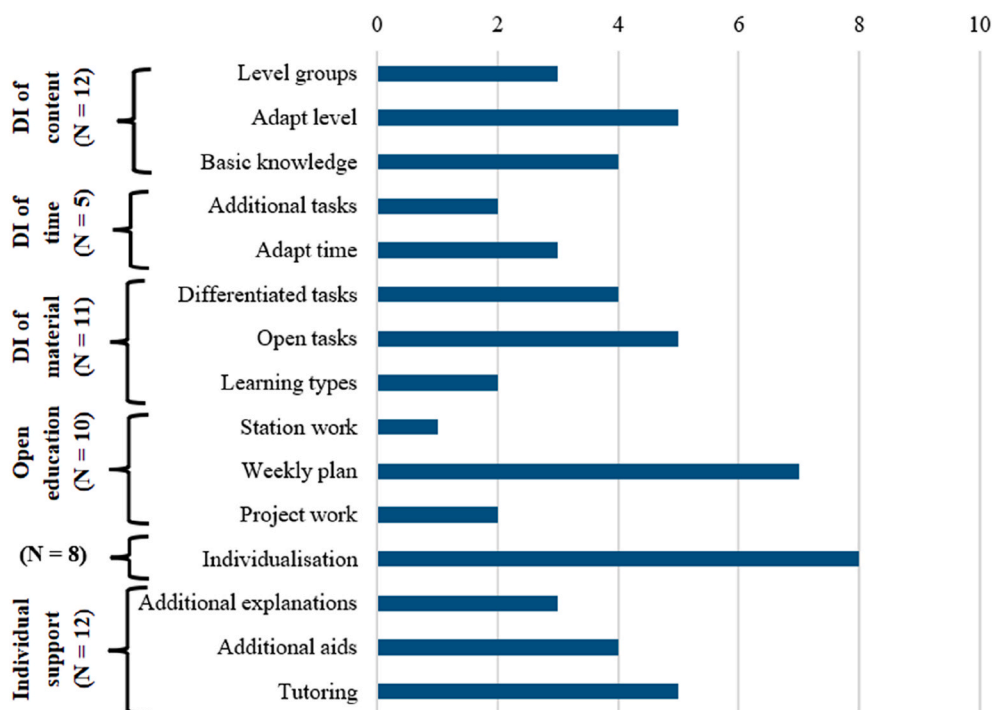


Fig. 3. Frequency of subcategories mentioned in the interviews; N = total of main category.

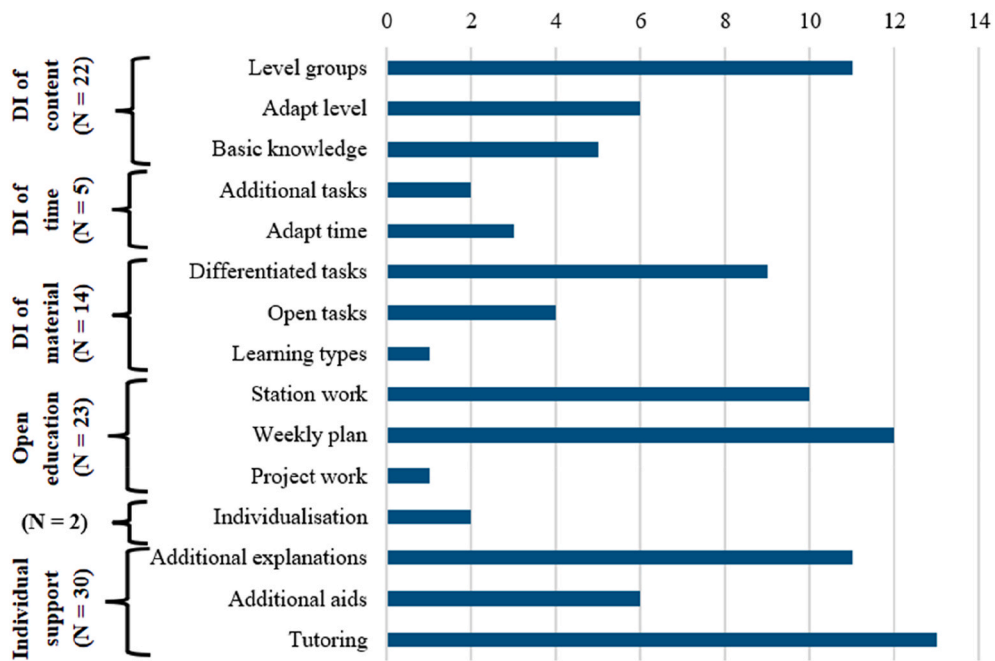


Fig. 4. Frequency of subcategories noticed in the videos; N = total of main category.

the class. From 1 to 18, and then the strongest child and the child in the middle (.) always work together. And the stronger child is the coach. [...]. It's not the best pupil and the weakest pupil. (CH_V4, Pos. 19)

This was a longer sequence in which two students took turns reading a story in verse form.

Research Question C focussed on how the frequencies of DI practices mentioned in the interviews and video clubs are related in each country.

The findings in the Austrian group (Fig. 5) demonstrate that there are large differences for the categories “Individualisation”, “Station work”, and “Additional explanations”. There are small differences for the

categories “Learning types”, “Differentiated tasks”, “Open tasks”, “Additional aids”, “Project Work” and “Basic knowledge”. It appears that the teachers in Austria advocate personalized support (“Individualisation”) much more frequently than they noticed it in their video lessons and that they considered DI practices such as conducting station work and providing additional explanations less frequently in interviews than they observed it in the videos. A category that was often observed in the video clubs but was never mentioned in the interviews is “Station work”. Hence, this practice was often used in the videotaped lessons, but it seems not to be a practice present in their attitudes towards DI. Moreover, “Learning types” is a category that was neither mentioned in the interviews nor observed in the videos, which implies that the

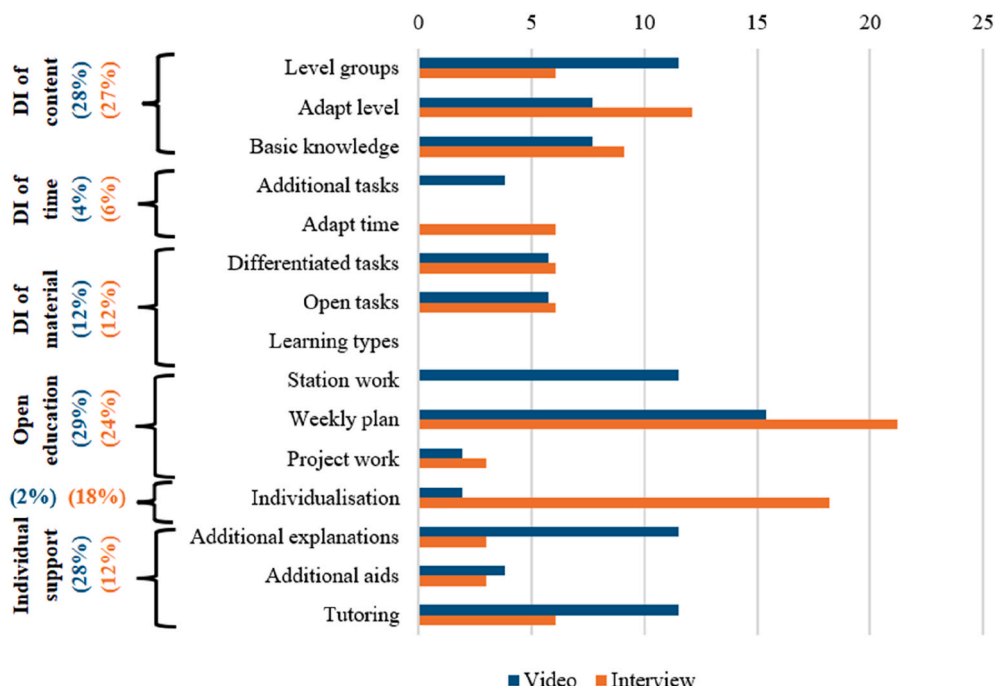


Fig. 5. Comparison of frequencies between the interviews and videos in Austria; percentage of main categories in brackets for each data collection (video/interview).

Austrian teachers do not tend to use differentiating practices in terms of visual, auditive or kinaesthetic access options.

When it comes to the differences in Switzerland, Fig. 6 demonstrates that there are large differences for the categories “Open tasks”, “Weekly plan”, “Additional tasks”, and “Level groups”. There are small differences for the categories “Adapt level” and “Basic knowledge”. It can also be seen that Swiss teachers had material that could be completed at different difficulty levels (“Open tasks”) or additional tasks for fast pupils forefront in their minds when asked about DI practices in the interviews. However, they rarely if ever, discussed these practices in the video clubs. Furthermore, the practice “Weekly plan” was quite often noticed in the video clubs, but never mentioned in the interviews, implying that weekly plans were not part of the Swiss teachers’ attitudes towards DI.

In order to ascertain the relationship between the frequencies of the categories in the videos and interviews, a correlation analysis was conducted for each country group. The relationships are shown in two scatter diagrams (Figs. 7 and 8). For Austria, there was only a weak correlation: $r = .06$; $n = 15$, $p = 0.83$. For Switzerland, however, there was a medium correlation coefficient, although, due to the small number, there is also no significance: $r = .40$, $n = 15$, $p = 0.15$. This shows that there is little connection between behavioural attitudes and perceptions in the video clubs among the Austrian teachers, but that there is some correspondence among the Swiss teachers. It also became apparent that the Swiss teachers noticed more forms of DI in the video clubs than they mentioned in the interviews.

With respect to Research Question D, whether there are country-specific differences, Fig. 9 shows that the Austrian teachers tended to mention and observe different DI practices more frequently than the Swiss teachers, especially concerning using differentiating approaches in terms of content or goals (main category “DI of content”) and concerning granting autonomy to students (main category “Open education”). A subcategory within “Open education” that was mentioned by the Austrian teachers very often but rather rarely by Swiss teachers is “Weekly plan,” indicating that this DI practice was implemented in the Austrian group more frequently. Also, the Austrian teachers compared

to the Swiss teachers were more focussed, for example, on adapting the level for their pupils (“Adapt level”), assisting their pupils concerning reaching basic knowledge and providing individualised support for their pupils (“Individualisation”). On the other hand, the Swiss teachers in comparison to the Austrian teachers focussed more, for example, on providing non-verbal learning aids (“Additional aids”), varying the material qualitatively and quantitatively (“Differentiated tasks”) or selecting material with different access options (“Learning types”). Teachers in both countries did not often mention practices in terms of time, such as providing additional tasks for fast pupils or granting more time for slower pupils (“Adapt time”).

To further clarify the question, whether there is variation in DI practices between the two countries, a chi-square test was employed. To test differences an equal frequency distribution was assumed. In most categories depicted in Fig. 9 the observed frequencies corresponded with equal frequencies in both groups. In total, the Austrian group had a slightly higher frequency of DI practices than the Swiss group. Specifically, there were significant differences only within the category of “Weekly plans” ($\chi^2 = .091$, $df = 1$, $p < 0.05$). Here, the Austrian group showed significantly higher frequencies than the Swiss group. Numerically larger differences were also apparent for “Learning types” and “Basic knowledge”, but the difference was not statistically significant. A tendency towards categorising knowledge as basic or advanced tends to be found more in the Austrian group.

5. Discussion

As part of our binational PD programme on inclusive education, we surveyed primary school teachers’ behavioural attitudes and noticing regarding DI practices. In the following, we summarise our results. Regarding Research Question A, it was found that DI practices in terms of individual support were most frequently mentioned in the interviews. This implies that teachers generally believe that every child must be able to learn at his or her own level (“Individualisation”). This is somewhat comparable to the results of Pozas et al. (2023) where according to Mexican students their teachers practiced mastery learning mostly in

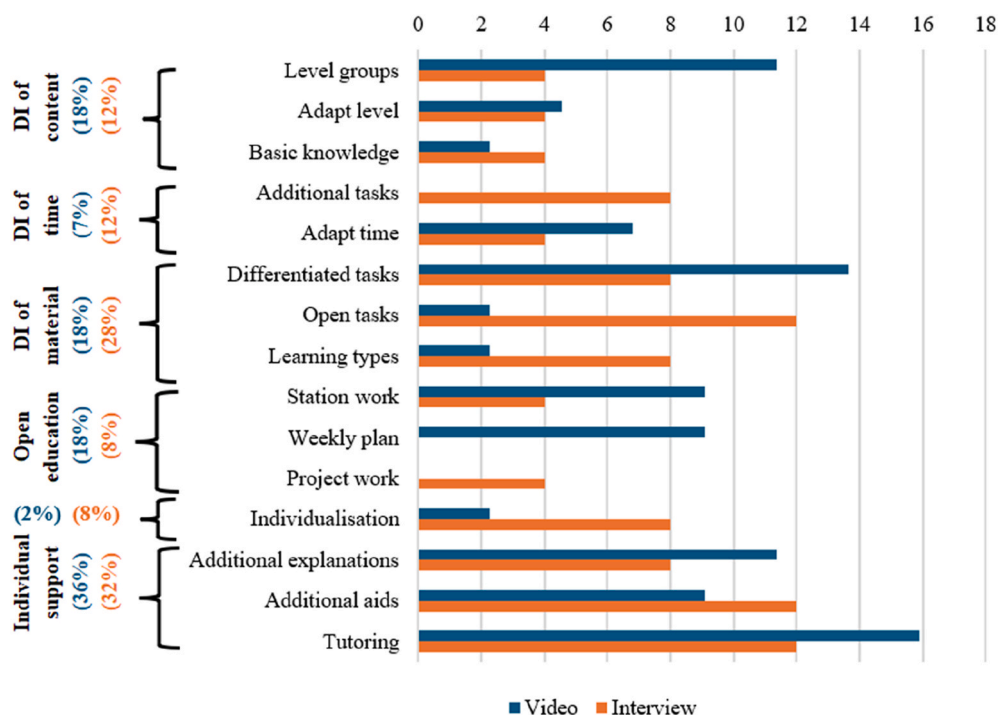


Fig. 6. Comparison of frequencies between the interviews and videos in Switzerland; percentage of main categories in brackets for each data collection (video/interview).

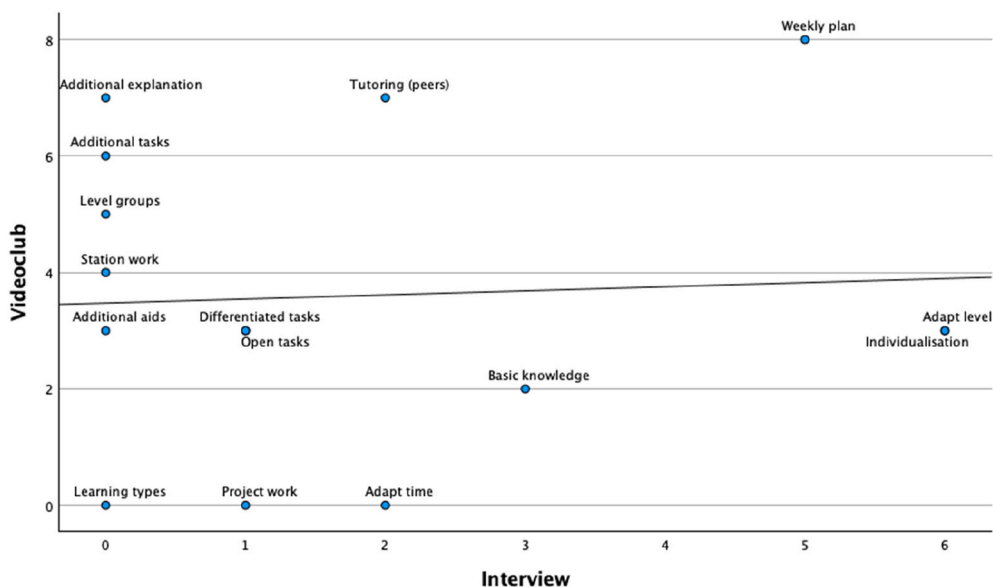


Fig. 7. Correlations of frequencies between the interviews and videos in Austria.

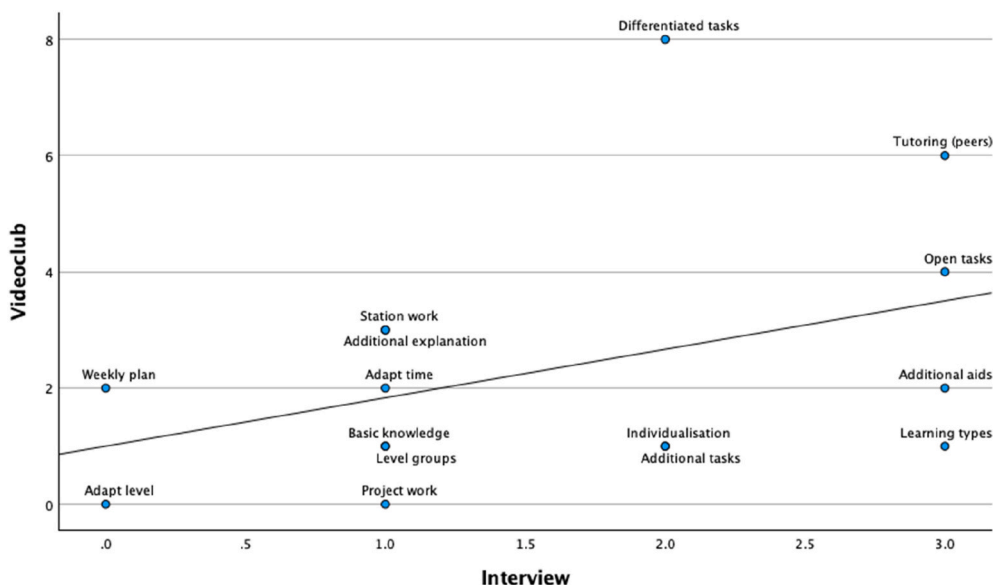


Fig. 8. Correlations of frequencies between the interviews and videos in Switzerland.

comparison to the other categories. Mastery learning also assumes that each student should progress at their own individual pace. All other DI practices in our category system were mentioned as well but less frequently. Thus, the categories expected in theory (Pozas & Schneider, 2019) are basically reflected in the behavioural attitudes of teachers towards DI.

The DI practices that teachers noticed in the video clubs (Research Question B) varied somewhat more in their frequencies compared to the interviews. In contrast with the interviews, the videos had few mentions of “Individualisation.” DI practices in terms of individual support, such as “Tutoring” and “Additional explanations”, were frequently discussed. This was also the case for DI practices in terms of open education, such as “Station work” and “Weekly plan”. Also, “Level groups” or “Differentiated tasks” were often noticed, while simpler DI practices in terms of time adjustments were hardly ever discussed. In the study by Pozas et al. (2023), individual support was also more common than other practices. In contrast to our findings, however, more time was also more common

in comparison.

The findings for Research Question C revealed that in the Austrian group, attitudes and perceptions in the video clubs little correspond. Certain DI practices are only found in the video clubs but not in the interviews. It remains unclear whether these forms of DI did not occur to them during the interviews or whether they only observed these practices in the videos from the other country group, which would mean that they only learned about these practices in the project. The Austrian teachers tended to be more general in the interviews regarding individual support, speaking mainly of individualisation; in the video clubs, they were more specific, and the practices “Additional explanations” or “Tutoring” came up as concrete implementations of individualisation. It stands out that the practices “Additional tasks” and “Station work” were discussed in the video clubs but not mentioned in the interviews. On the other hand, adapting time was never a topic in the Austrian video clubs, but it came up as part of their attitudes. In the Swiss group, there were less inconsistencies between attitudes and what was noticed. There was

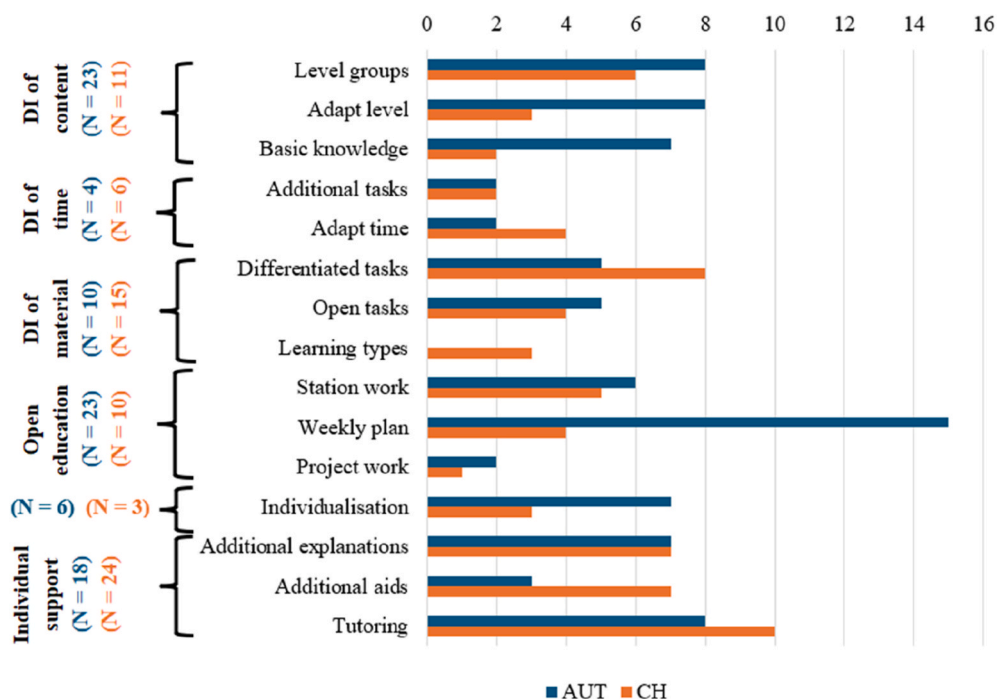


Fig. 9. Comparison between the frequencies of DI practices across video clubs and interviews summarised in Austria and Switzerland; N = total of main category.

agreement for the DI practices regarding individual support and somewhat for DI of content. However, DI practices in the area of open education (“Station work”, “Weekly plan”) or the practice “Open tasks” turned up merely in the video clubs and rarely in the teachers’ attitudes. In contrast, “Additional tasks” and “Project work” were mentioned in the interviews but not noticed in the video clubs. In summary, attitudes and perceptions coincide to a larger extent in the Swiss group and to a lesser extent in the Austrian group.

Research Question D dealt with differences in the DI categories between the countries. Austrian teachers tended to mention and observe different DI practices more frequently than the Swiss teachers, especially concerning using differentiating approaches in terms of content or goals (main category “DI of content”) and concerning granting autonomy to students (main category “Open education”). When we compare these differences using a chi-square test it showed that the practice of weekly plan was more apparent in the Austrian group. In the other categories, however, there were no significant country-specific differences.

One reason for the country-specific difference of weekly plan could be the greater heterogeneity of the participating classes in Austria. In this group, the school is run inclusively, whereas the Swiss school works with separate special classes. As Pozas et al. (2023) demonstrated, the six categories differed in their frequency depending on whether the classrooms were inclusive or non-inclusive. However, the difference does not seem to us to lie in the organisation of special needs teaching, as both schools teach roughly similar pupils with SEN. Instead, classes in Austria are either mixed in age or level. This allows (or forces) teachers to integrate long-term implementation of DI, as it is possible, for example, with more open and student-centred forms (see Fig. 1). In addition, the Austrian teachers seem more likely to create level groups within the class, i.e., one group that is limited to basic knowledge and one that includes tasks for advanced knowledge. A certain relationship with the results of Gheysens et al. (2021) can also be seen here. There was a correlation between self-assessed competence in noticing features of inclusive teaching and more frequent use of certain DI practices in their study. The Austrian teachers in our study might have higher scores in this respect, which means that they were probably more competent in perceiving different features of DI practices and that these practices were more prominent in the video clips (see Figs. 7 and 9).

When we compare our frequencies of the different DI practices with other studies such as Pozas et al. (2020) or Smit and Humpert (2012), it appears that DI practices relating to time adaptation are less dominant. This implies that the teachers in our study are more experienced in dealing with heterogeneous learning groups as adaptation of time can be seen as less elaborated forms of DI practices. An alternative interpretation would be that they prepared specifically for the video clubs and therefore avoided these rather unspecific DI practices. Another explanation is that Pozas et al. (2020) and Smit and Humpert (2012) examined higher year classes in which teachers might tend to do more instructing than student-oriented learning. Also, tutoring was more frequent in our study than in the other two, which was particularly evident in the video club’s prepared lessons. Tutoring was shown to be methodologically diverse and to take place in different group sizes, from pairs to groups of four. What is similar to Pozas et al. (2020), however, is that project work occurs least frequently. The other open DI practices (see Fig. 1) were not part of Pozas et al. (2020), while the general frequency of open DI practices in Smit and Humpert (2012) was comparable.

6. Conclusion

Based on a PD project in two countries, we found that teachers’ behavioural attitudes and their noticings in video clubs are quite consistent regarding relevant practices of DI. The somewhat smaller range of DI practices in the Swiss group might be due to greater pressure from school management and the authorities to provide separate education. Such organisational conditions and influences by policy makers on the practice of DI were not mentioned in this study but are addressed in other studies (Griful-Freixenet et al., 2020; Smit & Humpert, 2012; Walton et al., 2022). It needs to be added that some of the Swiss teaching staff reject the premise of inclusion. As already mentioned in the theory, there are teachers who find the inclusion of children with SEN as an additional burden to their daily work. In addition, some Swiss teachers said that they prefer to lead the class strongly and do not like to use student-centred DI practices. According to Walton et al. (2022), the context for the functioning of the group and the development of an inclusive practice is important. Internal (school team) and external

expertise (e.g., school developer) is crucial for ensuring continuous learning, and mutually supportive relationships within learning communities as ours are essential.

It can be assumed that if the attitudes of the participating teachers and the goals of a PD programme are aligned, success will also be achieved (van Aalderen-Smeets & Walma van der Molen, 2015). Even if Blömeke et al. (2015) postulate that such alignment ultimately leads to high performance in the classroom, we are somewhat more sceptical in this regard, as we did not really see any changes in the video clips over the course of the project (Smit et al., 2024). The reasons might be that significant changes would probably take more time, or the PD would have to be more intensive. However, this would have overburdened the teachers in addition to their daily teaching.

One limitation of our study is that we did not evaluate the quality of teaching. Furthermore, the relatively great freedom of teachers to use different DI practices in the lessons for the video clubs led to very different—also subject-related—lessons so that no comparable reviews of student performance took place. Such rather quantitative approaches for measuring effectiveness require a larger sample than ours in order to generalise. However, our study indicates that the construct of DI cannot be tested with three or four items or with a single scale because the implementation of DI is too diverse for that. Pozas and Schneider (2019) also point this out. It should be noted that DI is not the only dimension when it comes to describing effective inclusive teaching. Finkelstein et al. (2021) mention five dimensions, and if one of them, for example, classroom management, is not working, the other teaching practices are also affected. Conversely, it can also be posited that effective implementation of DI can influence classroom management. We could have additionally collected data on such factors that could explain differences between attitudes and noticing.

Suggestions for further research projects have already been mentioned, such as the inclusion of performance data or, at a later stage, students' views on the suitability of the differentiation practices (Is the level right for them? Do they feel overwhelmed or underchallenged?). This would extend the framework of Blömeke et al. (2015) to include the users of the teaching programme. For teaching practice or for teacher training, it is important to note that not all DI practices are equally demanding. In the model (Fig. 1), practices on the left can be applied relatively easily. With more experience, more complex practices can be implemented, which may require a little more preparation and may be better established in a teacher team. We also suggest for future research studies to include next to the impact of different DI practices also the degree of their student-centredness.

CRedit authorship contribution statement

Robbert Smit: Writing – review & editing, Writing – original draft, Visualization, Software, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Eva Weingartner:** Writing – review & editing, Writing – original draft, Software, Methodology, Investigation, Formal analysis.

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Declaration of competing interest

The authors report there are no competing interests to declare.

Appendix

1. Interview protocol

Group interview – kick-off meeting.

Time: 30 min.

Ask questions in German standard language, speak in standard language and, if possible, use standard language; if someone does not feel comfortable, Swiss dialect is also acceptable.

Questions:

Main topics.

1. What do you understand by inclusive teaching?
2. How is inclusion manifested in your lessons? Follow-up question: What are lessons like for children with special needs?
3. What does an inclusive lesson in your class look like?
4. How do you plan a lesson where a special needs teacher (SEN) and a mainstream teacher (MT) teach together? (Follow-up questions: Who does what? Is there such a thing as a division of roles in planning and teaching?)
5. What opportunities and challenges do inclusive lessons present for you?

Optional.

6. What support do you think would still be necessary to implement inclusive teaching in the best possible way?
7. What options do you have for supporting situations involving children with special needs?

Instructions:

The respective question is addressed openly to everyone.

Specific individuals are only specifically addressed if the same people always speak up and others never get a chance to speak.

Keep an eye on the time.

Group interview – final meeting

Time: 30 min.

Questions:

Main topics:

1. – 5. See kick-off meeting.

6. What will you take away from the project for your (inclusive) teaching?

Optional:

7. – 8. See kick-off meeting.

Data availability

Data will be made available on request.

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