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Problems, Chances and Limitations of Facilitating Self-Directed Learning at a German Gymnasium

Bachelorarbeit zur Erlangung des akademischen Grades eines

Bachelor of Education

Deutscher Titel:	Probleme, Chancen und Einschränkungen bei der Umsetzung von selbstgesteuertem Lernen an einem deutschen Gymnasium
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Zusammenfassung

Selbstgesteuertes Lernen wird immer wichtiger. Lernende müssen in einer sich ständig wandelnden und weiterentwickelnden Welt in der Lage sein, mit den neuen Herausforderungen umgehen zu können. Selbstgesteuertes Lernen gibt den Lernenden die Chance, sich diesen neuen Herausforderungen erfolgreich zu stellen. Die Umsetzung dieses Lernkonzepts in der Schule ist jedoch ein gefährliches Unterfangen, da viele Hindernisse überwunden werden müssen.

Im Rahmen dieser Bachelorarbeit wurden Unterrichtsstunden an einem deutschen Gymnasium beobachtet, um herauszufinden, inwieweit in diesen Stunden Elemente des selbstgesteuerten Lernens gefunden werden können. Für den Vergleich wurden die Prozesselemente Knowles' des im Jahre 1975 veröffentlichten Buchs "Self-Directed Learning: A Guide for Learners and Teachers" auf die Beobachtungen der Stunden angewandt.

Ein zentraler Punkt der Beobachtungen und Interviews der Lehrkräfte war es, die Limitierungen hinsichtlich der institutionellen Rahmenbedingungen und der Einstellungen der Lehrkräfte zu untersuchen. Die Beobachtungen unterschieden sich zum Teil sehr. Während in vielen der beobachteten naturwissenschaftlichen Stunden Elemente des selbstgesteuerten Lernens gefunden werden konnten, wurden die Sozialkundestunden als lehrergesteuert analysiert. Außerdem unterschieden sich die Einstellungen der Lehrkräfte hinsichtlich selbstgesteuerten Lernens.

Diese Bachelorarbeit beinhaltet auch die wissenschafltiche Kritik am Konzept des selbstgesteuerten Lernens und schlägt die Umsetzung von Grows "Self-Directed-Learning Model" (1991) vor, bei dem der Grad der Selbststeuerung der Lernenden mit fortlaufender Schulzeit zunehmen soll. Diese Arbeit ist nützlich für Pädagog*innen, Lehrplanentwickler*innen, Lehrkräfte und politische Entscheidungsträger*innen, um ihnen zu helfen, die Schwierigkeiten und Chancen der Umsetzung von selbstgesteuertem Lernen an Schulen zu erkennen.

Abstract

Self-directed learning is becoming more important than ever. In a rapidly changing world, learners must be ready to face new obstacles. Self-directed learning gives the learners the chance to adapt to these social contextual changes. But facilitating self-directed learning in formal settings seems to be a risky task and venture. To accomplish its facilitation, many limits must be overcome.

In this thesis, lessons at a German school called a Gymnasium – the type of school where learners can get the highest school level degree – were observed in order to find out in how far elements of self-directed learning can be found in the observed lessons. For the comparison, the process elements of Knowles' book "Self-Directed Learning: A Guide for Learners and Teachers" from 1975 were adapted to the observations of the lessons.

A central part of the observations and interviews of the teachers was to find out which limitations in the facilitation of self-directed learning can be found in terms of the institutional framework and the attitude of the teachers. The results of the observations highly differentiated. Whereas in many of the observed scientific lessons, many elements of self-directed learning were found, the lessons in social studies were teacher-directed. Also, a different attitude between the teachers was found in terms of the support for self-directed learning.

Importantly, the thesis includes the scientific critic of self-directed learning instead of excluding it and proposes the facilitation of Grow's "Self-Directed-Learning Model" (1991) where the level of the learner's self-directed learning is supposed to progress during school. This thesis is relevant for educators, curriculum developers, teachers and policymakers to help them identify the difficulties and chances to facilitate SDL in formal settings.

Vorwort

Die folgende Arbeit stellt eine empirische Studie bezüglich der Probleme, der Beschränkungen, aber auch der Chancen der Umsetzung von selbstgesteuertem Lernen an einem deutschen Gymnasium dar, welches drei Wochen lang besucht wurde.

Ein besonderer Dank gilt zuallererst der Schule, die diese Bachelorarbeit überhaupt erst möglich machte. Dabei danke ich vor allem der Personen aus der Schulleitung, die dem Projekt zustimmten, aber natürlich auch den entsprechenden Lehrkräften, die mir freiwillig anboten, ihre Unterrichtsstunden zu beobachten und zu untersuchen und mir zusätzlich erlaubten, sie zu interviewen.

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1. Introduction

The world is changing rapidly. Due to globalization and the development of new machines and technologies, the challenges and tasks that people must face are getting more complex than ever (e.g. Morris, 2019a). The aim of education in school is to prepare learners for life and therefore it must take these new challenges into account (Morris, 2019b). Rogers (1969) points out that exploitation of self-directed learning is a fundamental aim of formal education: "A way must be found to develop a climate in the *system* in which the focus is not upon teaching, but on the facilitation of self-directed *learning*" (p. 304).

In the following, the theoretical framework of self-directed learning (SDL) is presented that has its origins in adult education. In doing so, the advantages of the SDL process will be shown without ignoring its difficulties and the advantages of its counterpart being teacher-directed learning (TDL). The research objective of this thesis is to find out as to how far elements of SDL and respectively TDL can be found in lessons at a German *Gymnasium* and which problems, chances and limitations the facilitation of SDL has.

This thesis covers the observations of lessons at a German Gymnasium that were taken over a period of three weeks. Different subjects were observed in order to improve the explanatory power of this study. In a short view the context of the observation of the lessons will be shown by explaining the German school system. By using Knowles' (1975) process elements of SDL and TDL, the different observations of lessons are compared in order to show how self- or teacher-directed they were. This will give a rough insight in how far self-directed lessons at German Gymnasiums are realised. It will also be focused on the effects a self or teacher-directed learning process had on the learners. The observed teachers were interviewed to analyse their attitude towards SDL and the reasons why their lessons were the way they are.

Suggesting that facilitating self-directed learning seems to receive more attention than ever in order to face the new challenges in life, this bachelor thesis is useful for those who want to have a look in how far elements of SDL can already be found in lessons at a German Gymnasium and which impact it has on the learners. Also, it helps educators, curriculum developers, teachers and policymakers to identify the difficulties and chances to facilitate SDL in formal settings. The later discussed *Staged-Self-Directed-Learning*

Model (Grow, 1991) will give them guidelines as to how SDL could be facilitated. Furthermore, this thesis does not ignore the legitimate critic against SDL which might help to refine the idea to facilitate SDL in formal education and which does not ignore the possible advantages of TDL in specific situations.

2. Theory

2.1 The Classic Way of Teaching: Teacher-Directed Learning

Behaviourism is a learning theory whereby the aim is to control learner's behaviour (Morris, 2019b). This learning theory goes together with TDL (Morris, 2019b). TDL is a process where the teacher is in the centre of the learning process. It can be defined as

> "any increase in a student's knowledge or skill brought about by initiatives taken by a teacher, which includes a selection of the learning to be accomplished, presentations about it, assigned study and practice activities, and a test to measure mastery" (Gibbons, 2003, p. 2) where "learning objectives are definable at the planning stage and are intended to be uniform, and the successful accomplishment of which defines the learning 'success'" (Morris, 2019a, p. 59).

TDL is usually attributed to "pedagogy". Pedagogy being described "as the art and science of teaching, but its tradition is in the teaching of children" (Knowles, 1975, p. 19). As one can assume, TDL represents the "classic way" of teaching experienced for many learners as the default kind of lesson. In this concept, the learners are supposed to do (and learn) what the teachers want them to. If they follow the instructions, they are rewarded and if not, they are punished. Normally, the teacher expects only one right answer that the learners must give in order to be rewarded. This way of teacher-directed teaching has been dominant for centuries, but in the last decades criticism on this form of teaching has been rising (e.g. Knowles, 1975; Gibbons, 2003; Morris, 2019a, b). For many critics, the alternative is SDL, because TDL would not prepare the learners for the arising challenges in life after school (e.g. Morris 2019a, b)

2.2 A Basic Competence: The Roots of Self-Directed Learning

SDL originated in *humanistic philosophy*, *pragmatic philosophy* and *constructivist epistemology* representing "a process of learning that is individual, purposeful and

developmental" (Morris, 2019b, p. 636). Instead of being *instructed* by the teacher, learners *construct* their own learning process. The teacher simply provides them with the framework in which the construction can take place.

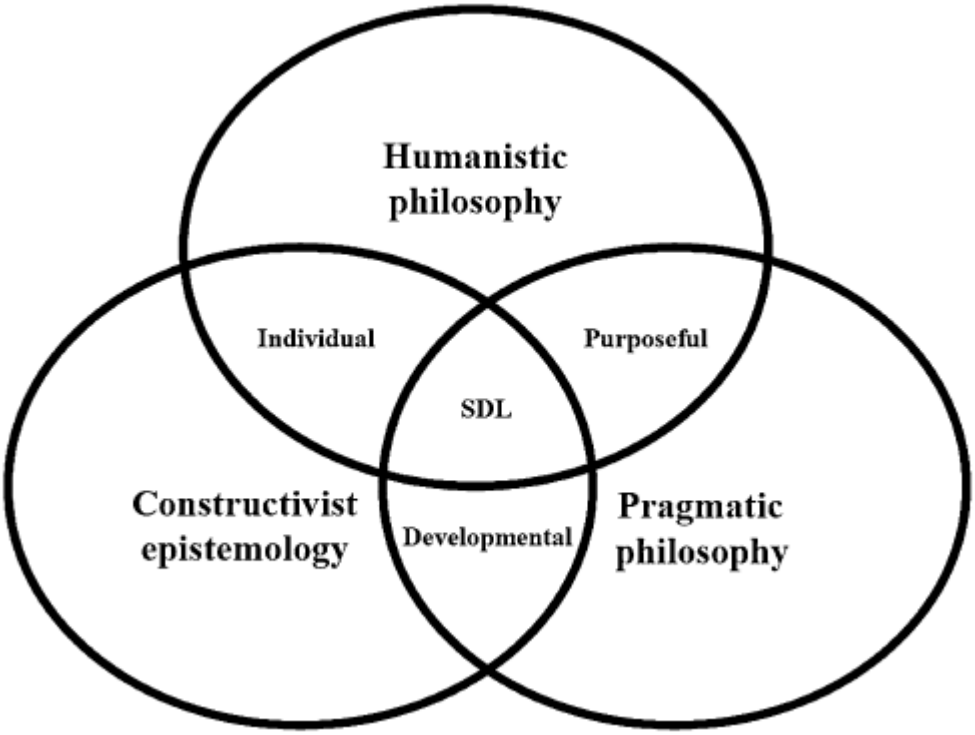

Figure 1. Foundational Positions of Self-Directed Learning. Adapted from „Self-directed learning: A fundamental competence in a rapidly changing world," by T.H. Morris, 2019, *International Review of Education, 65*(4), p. 636.

As seen in Figure 1, SDL is the result of the intersection from humanistic philosophy, pragmatic philosophy and constructivist epistemology. SDL being pragmatic in a way that adults must often solve problems on their own and that is why usually they are the ones to initiate the learning process themselves (Morris, 2019b). In terms of the humanistic approach, building on the works of Elias and Merriam (1995), and Leach (2018), Morris (2019b) points out that "learners are autonomous and capable of smart decision-making" and that they "possess an urge towards self-actualisation" (p. 637).

Constructivism being the antipole of behaviourism is a theory of learning which assumes that individuals (e.g. learners in school) construct their own understanding by connecting what they already know and have experienced with what they get in contact with (Resnick, 1989, as cited in Richardson, 2003). Instead of being *instructed* by the teacher, learners *construct* their own learning process.

Building on the work of Merriam, Caffarella and Baumgartner (2007), Morris (2019b) points out that "constructivists view learning as an individual, interpretive and active process of meaning-making" (p. 639). Furthermore, SDL can be defined as a "basic human competence — the ability to learn on one's own" (Knowles, 1975, p. 17). Knowles (1975) also defined SDL as a "process in which individuals take the initiative; with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (p. 18). SDL can be better understood when compared to the already described counterpart TDL which is normally attributed to pedagogy. SDL on the other side is based on "andragogy" being "the art and science of helping adults (or, even better, maturing human beings) learn" (Knowles, 1975, p. 19). By comparing SDL and TDL, it becomes clear that the teaching of learners, in which the teacher plays the central role, is the key element of a TDL process, whereas in SDL processes, the key element is that the learners are only supported so they can learn on their own. Therefore, teachers are not taking the central role in the learning process, but their role shifts towards learning advisors who must be extremely professional if the SDL process is to be successful.

Whereas TDL follows the assumption that the learners are dependent and need the teacher to tell them what they should and how they have to do it, SDL follows the assumption that naturally human beings need to be self-directed in order to mature (Knowles, 1975). Grow (1991) pleads for an increase of the learners' self-direction over the years at school. Whereas in the beginning learners are quite dependent they are supposed to be independent at the end of school (see chapter 2.7). Even though SDL originated from adult education and is also discussed in "the fields of […] higher education, and psychology" the discussions about it are also held from perspectives like "business, leadership, human resources, library sciences and medicine" (Kranzow & Hyland, 2016, p. 3). This shows "that the discourse of SDL is more imperative than ever" (Kranzow & Hyland, 2016, p. 3). As mentioned before, one of the main goals of SDL is to prepare adolescents for the upcoming challenges in life. This includes being successful in jobs as well as social lives.

2.3 A Vast Difference: Comparing Self-Directed and Teacher-Directed Learning

2.3.1 Process Elements

Knowles (1975) compared the process elements of TDL and SDL. He created seven categories in which the two different processes of learning being *climate, planning, diagnosis of needs, setting goals, designing a learning plan, learning activities* and *evaluation* can be compared (p. 60).

As can be seen in Appendix 1, the climate between the two types of teaching is completely different. In TDL processes, the teacher is authoritarian and judges the learners for their activity and accomplishments. That is why lessons become competitive among learners. SDL stands out due to support between teacher and learners, but also between the learners themselves. It tends to be quite informal and it is also characterised by mutual respect between the learners and the teacher. Whilst in TDL the planning, the diagnosis of needs and the design of the learning plan is done primarily by the teacher, it is done mutually in SDL. In SDL, the learning plan is not a content unit or something similar, but rather the learners learn in a project in which they are the central actors and where they can act independently and self-directedly. Not transmittal techniques, assigned reading but rather inquiry projects, independent studies and experiential techniques are carried out in SDL processes. Also, the learners evaluate themselves, while in TDL the teacher evaluates the learners in the already mentioned judgemental and competitive way which results in the described mood of TDL processes. Whilst the teachers act as learning instructors in TDL processes, they act as learning advisors in SDL processes.

2.3.2 The Role of the Teacher

Instead of losing any importance by becoming a mere learning advisor who just observes the learners, does not do anything and becomes obsolete, in SDL processes the teacher's role becomes even more central than before. Despite the development of new technologies, teachers who teach learners how to learn, and who help them navigate through the challenges between childhood and adulthood, "will always be irreplaceable" (Gibbons, 2003, p. 5). In fact, learners will not be able to be self-directed at the start. This competence must be trained as will be seen in the SSDL Model in chapter 2.7.

The teacher's role changes significantly. To be able to teach in a self-directed way, they must be well prepared. As an "advisor" in the learning process, even more pedagogical knowledge is required than before (Kraft, 1999). Thus, teachers need "a full professional repertoire of instruction, including training, coaching, guiding, and counselling skills" (Gibbons, 2003, p. 3). A teacher who is not this professional educated would not be able to give the learners the chance to acquire the skills and abilities that SDL processes aim for. Thus, SDL would not be successful.

As an advisor or also as a "facilitator", the role of the teacher might be to assist the learners on their journey to enhance their self-directed learning competence, so that step by step they can take more and more control over their own process of learning (Morris, 2019b). Not only the teachers but also the learners need specific requirements for SDL to be successful.

2.3.3 Requirements for Self-Directed and Teacher-Directed Learning

While it may be quite logical that the skills that learners need to be successful in traditional TDL processes – learning what the teacher wants them to learn and thus having good grades – are the abilities to listen to the teacher very well, being able to read texts and books rapidly and effectively, raise their hand very often and say what the teacher wants to hear, predicting exam questions and learning for them very hard, SDL follows a different pattern (e.g. Knowles, 1975).

Gibbons (2003) defines SDL as "any increase in knowledge, skill, accomplishment, or personal development that an individual selects and brings about their own efforts using any method in any circumstances at any time" (p. 2). Logically, this process of learning requires a different set of skills and abilities in comparison to TDL. Learners formulate their own learning goals, take over the learning process and evaluate the teaching operations. That is why the new skills and abilities learners require, must be metacognitive ones (Gibbons, 2003) and an "attitude of cognitive openness" (Morris, 2019a, p. 61) seems obligatory. This attitude can be defined as an "openness to new ideas and activities, ability to adapt to change, and tolerance of ambiguity" (Oddi, 1986, p. 99).

Table 1

Skills and Abilities of SDL

1. An understanding of the differences in assumption about learners and the skills required for learning under teacher-directed learning and self-directed learning, and the ability to explain these differences to others.
2. A concept of myself as being a non-dependent and a self-directing person.
3. The ability to relate to peers collaboratively, to see them as resources for diagnosing needs, planning my learning, and learning; and to give help to them and receive help from them.
4. The ability to diagnose my own learning needs realistically, with help from teachers and peers.
5. The ability to translate learning needs into learning objectives in a form that makes it possible for their accomplishment to be assessed.
6. The ability to relate to teachers and facilitators, helpers, or consultants, and to take the initiative in making use of their resources.
7. The ability to identify human and material resources appropriate to different kinds of learning objectives
8. The ability to select effective strategies for making use of learning resources and to perform these strategies skillfully and with initiative.
9. The ability to collect and validate evidence of the accomplishment of various kinds of learning objectives.

Note. Reprinted from "Self-Directed Learning: A Guide For Learners and Teachers," by M. S. Knowles, 1975, p. 61.

As can be seen in Figure 2, Knowles (1975) formulated different skills that are needed to achieve the competence of SDL. These skills are not natural for learners, but instead must be trained and developed first. Also, Grow (1991) assumes that a "complex collection of self-skills and learning skills" is required "which not all learners spontaneously acquire" (p. 139). In chapter 2.7 of this thesis, Grow's (1991) SSDL Model presents a guide for facilitating SDL, which is supposed to give teachers guidance to create a learning environment which helps the learners acquire these skills progressively. The requirements learners need to attend SDL processes are narrowed down to curiosity and motivation.

> "Thus, learner appreciation that no knowledge is truly secure in the course of time or across context seems imperative for the maintenance of curiosity and motivation for self-directed learning" (Morris 2019a, p. 61).

Building on the works of Abele and Wiese (2008), Helterbran (2017), Kranzow and Hyland (2016), and Marsick and Watkins (1992, 1996), Morris (2019a) defined SDL as "a *critical* competence that empowers adults to adapt accordingly to fluid and complex social contextual changes" (p. 57). The next section of the thesis is about why SDL is needed and why lessons should not be teacher-directed all the time.

2.4 Facing the Challenges in Life: Reasons for Facilitating Self-Directed Learning

> „It is a tragic fact that most of us only know how to be taught; we haven't learned how to learn" (Knowles, 1975, p. 14).

This sums up one of the key reasons why self-directed learning should be facilitated in schools. A fundamental problem is that too often learners are too dependent on the actions of the teachers. Learners do not really learn how to learn. When they graduate from school, they enter a world without a teacher who guides them on every step. This raises the question as to how far learners could be able to adapt to challenges in life without ever having to think and act self-directedly in school. After school, the former students must decide and do things on their own. It raises the question to what extent young adults or adolescents will be able to do that when they are just used to following the instructions their teachers have kept giving them for several years. After almost 13 or even just 12 years in school – there is a possibility in some parts of Germany to get the highest degree in 12 instead of almost 13 years – former students are thrown into the big adventure of adulthood for which they might not be well prepared. But learners must be able to acquire the skills needed in a rapid changing world (Knowles, 1975).

As Grow (1991) assumes "[t]he goal of the educational process is to produce self-directed, lifelong learners. Many current educational practices in public schools and universities, however, do more to perpetuate dependency than to create self-direction" (p. 127). Later in this thesis it will be analysed whether this applies for the observed German Gymnasium.

Knowles (1975) points out that there is "convincing evidence" (p. 14) that learners who are *proactive* and put the learning process into their own hands, learn faster and better than the *reactive* learners who just react to the instructions of the teacher. He also justifies the use of SDL regarding human nature by saying that learners grow from being

dependent little children to persons with the desideratum to emancipate from the control of parents, teachers and other adults. Thus, becoming self-directed is essential (Knowles, 1975). For him, the most important reason why SDL is essential and obligatory is the fact that the world is changing rapidly. What is learnt now, might be obsolete in a few years, which is why "the main purpose of education must now be to develop the skills of inquiry" (Knowles, 1975, p. 15).

Moreover, learning becomes a lifelong process. While in the past, at school the learners have learnt most of what they needed for their entire life, in this new ever-changing world acquiring knowledge at school is not enough (Knowles, 1975) which is why SDL has become "a prerequisite for living in this new world" (Knowles, 1975, p. 17). The new world, we live in, will pose challenges that learners cannot already be prepared for by teaching, because nobody knows what these challenges and the requirements to successfully face them will be like. That is why being self-directed is more important than ever. Learners must be ready to face the obstacles not even their teachers are able to predict. In 1969, Rogers pointed out that "[i]n the coming world the capacity to face the new appropriately is more important than the ability to know and repeat the old" (p. 304).

Being alive means lifelong learning. It will never be possible to be able to have an instant answer for every obstacle that has to be faced. These obstacles can be found in both job and social life. However, it can be learnt how to adapt to different social contextual changes in life, so learners are provided with the toolset to conquer them.

> „Fostering adult learner's competence to adapt appropriately to our ever-changing world is a primary concern of adult education" (Morris, 2019a, p. 56). The path to become self-directed might not be easy but "in spite of its complexities- self-directed learning remains the North Star of adult education" (Grow, 1991, p. 128).

Kranzow and Hyland (2016) regard SDL not just as something that is quite important but as a "critical competence" (p. 4). The United States Office of Personnel Management (OPM) defines competence as "*a measurable pattern of knowledge, skill, abilities, behaviors, and other characteristics that an individual needs to perform work roles or occupational functions successfully*" (as cited in Rodriguez, Bright, Gregory & Gowing, 2002, p. 310). Moreover, this process has the pretence to foster a learner's path toward increasing self-actualisation (Groen & Kawalilak, 2014; Maslow, 1943; Rogers, 1969, as cited in Morris, 2019a). Furthermore, sticking to teacher-directed learning would bear the consequence that learners stay inflexible due to the habitual patterns of thinking and

judging which are directed by the teacher. Thus, they would "[fail] to see the need to adapt to social contextual changes" resulting in "a lack of motivation for self-directed learning" (Morris, 2019b, p. 635).

2.5 Good for Everyone? Profits of Self-Directed Learning

Everyone profits from a well-executed SDL process as it is "an essential competence for living and working successfully in our modern world" (Morris, 2019b, p. 639) and society. Furthermore, SDL "is showing great promise in the preparation of students for post-college life" (Boyer, Edmondson, Artis & Fleming, 2014, p. 20). As mentioned before, in the SDL process, the learners get the chance develop the competence to adapt to social contextual changes. Also, SDL is said to be essential for people in complex careers in order to maintain and enhance their skillset and knowledge (Dunlap & Grabinger, 2003; Oddi, 1987, as cited in Morris, 2018). Seibert, Kraimer, and Crant (2001) found out that proactive personality correlates with the success people have in their respective careers. Being able to adapt to rapidly changing obstacles and challenges is the key for success in career.

Not only the learners but also the teachers profit from SDL processes. As described before, the teacher needs much more skills and abilities in a SDL than in a TDL process. These skills and abilities will help them to improve the quality of their lessons, because in SDL processes there is not just one possible outcome, but rather several, the teachers will learn a lot themselves. Of course, being self-directed helps the teachers to adapt to social contextual changes as well.

2.6 A Blurry Concept? Criticism of Self-Directed Learning

As written down in this thesis, there is a lot of literature that focuses on different theories of SDL and on the positive effects that the facilitation of SDL would have on the learners. But too often, it is simply praised without looking at the downside of the concept. This is the reason why this thesis includes a review of critical literature about SDL, so the scientific controversy of the topic is not neglected.

It is a hasty conclusion to say that SDL is better that TDL per se. TDL is "an efficient way to present new bodies of knowledge and practice" (Gibbons, 2003, p. 2). Thus, there might be certain stages and parts in a lesson where it might be smarter to implement elements of TDL. As Flannery in 1993 pointed out, SDL is not viable in every situation (as cited in Morris, 2018) which is why TDL cannot completely be regarded as obsolete. Grow (1991) assumes that "[s]elf-direction is advantageous in many settings […] but there is nothing inherently wrong with being a dependent learner, whether that dependency is temporary or permanent, limited to certain subjects or extending to all" (p. 127).

Critics point out that SDL lacks a unitary definition as well as differentiations between the theoretical frameworks. Different definitions of SDL were used in this thesis as well. Furthermore, the justification of SDL would be diverse and of different quality. There is also the problem that the empirical findings are variegated (Kraft, 1999). The word self-directed learning indicates that the learners learn something themselves. The expression "self" is criticised to be misleading regarding the thought that every learning process in its nature is always self- and externally directed at the same time (Kraft, 1999). Prenzel (1993) points that for the construction, learning always needs pieces of information that are externally introduced, which might lead to the impression that the expression of self-directed learning itself is delusive, because a fully *self*-directed learning process does not seem possible (Kraft, 1999). A solution is not to see self-directed learning as the opposite of external directed learning, but to identify the level of being self- or externally directed in a continuum of two poles (Hollenstein, 1994, as cited in Kraft, 1999).

A further problem of SDL concerns the skills and abilities, a learner needs to require for SDL to be successful. In 1991, Beck, Guldimann, and Zutavern (as cited in Kraft, 1999) write about a metacognitive awareness that characterises an autonomous learner. Kraft (1999) describes difficulties in concretising the requirements of SDL and measuring them in empirical tests. She also criticises that more times than not the requirements and conditions the learners need to perform SDL are disregarded. That is why SDL cannot simply be ordered. Instead various processes of support are needed for the SDL process to be successful (Kraft, 1999).

An argument often used by supporters of SDL is that the learning process would fit for every individual learner. Thus, learners would get the chance to "work individually and independently" in order "to learn how to learn, or how to teach themselves" (Gibbons, 2003, p. 5). Contradicting this argument, many studies found out that SDL can intensify

discriminations between different learners (e.g. Hollenstein, 1989; Kuwan, 1998; Arnold & Lehmann 1998; Weber 1998, as cited in Kraft 1999). In 1997, Dubs (as cited in Kraft, 1999) arrives at the conclusion that especially weaker students tend to get penalised by the facilitation of SDL. A possible explanation is that SDL requires a lot of skills and abilities like self-management that rather stronger learners would be equipped with (Kraft, 1999). This can be interpreted as a pleading for TDL where the teacher pays attention that weaker learners are not lost during the learning process.

The fundamental concern about SDL is seen by Kraft (1999) as just the fact that something is done by the learner themselves is regarded as superior and more positive than an externally directed learning process. She claims that learning in a self-directed way cannot generally be regarded as a quality characteristic (1999).

Even though, SDL claims to prepare learners for the ever-changing world regarding the social context, it is questionable if a single learner could adapt to these social-contextual changes even when the single institutions of learning already fail in doing that (Kraft, 1999). Single learners might react flexible, but they could also be easily overstrained in trying to do so (Kraft, 1999). As described before, TDL also have advantages in specific contexts, which leads to the point that the belief of replacing all teaching manuals with SDL because it is assumed that learners would prefer these forms of learning and that learners could learn self-directedly without any problems, is erroneous for sure (Kraft, 1999).

Even as a supporter of SDL, a radical change from TDL to SDL could cause serious consequences. Even Knowles (1975) himself points out that facilitating SDL is “a very risky venture” (p. 44) and if students enter a SDL project without having acquired the important skill of self-directed inquiry before, it tends to lead to “anxiety, frustration, and often failure” (Knowles, 1975, p. 15). Hence, the results of the learning process could be deteriorating instead of improving. There exists the concern that “adults who undertake self-directed learning are not necessarily competent self-directed learners” (Morris, 2019b, p. 637) and that therefore “it is possible that their learning outcomes are not efficient or successful in achieving their learning objectives” (Morris, 2019b, p. 637). That sums up the huge problem that too often the learners do not have the required skills and abilities to perform SDL (Jossberger, Brand-Gruwel, Boshuizen & van de Wiel, 2010; Kicken, Brand-Gruwel, van Merriënboer & Slot, 2009; as cited in Morris, 2018).

> "when students who are used to a teacher-directed learning environment suddenly enter an educational setting which demands them to direct their own learning, their lack of self-directed learning skills may impede them in becoming successful independent learners. It is therefore of utmost importance that students who enter on demand education are provided with sufficient support to develop their self-directed learning skills" (Kicken et al., 2009, p. 440).

But in contrast to these points, there is the fundamental concern that teacher-directed learning is often not suitable to prepare learners for life (Alston et al., 2016; Brooks & Edwards, 2013, as cited in Morris, 2019a). Thus, the SSDL Model tries to provide a guide for the facilitation of SDL in a successive way. As Grow's (1991) SSDL Model will show, the teaching method must match the learner's level of self-direction which is why at the beginning TDL is needed.

2.7 Facilitating Self-Directed Learning: The Staged-Self-Directed-Learning Model

Grow's (1991) Staged Self-Directed Learning Model does not assume that learning processes should be self-directed from the start but rather that they should become more self-directed step by step. Thus, SDL is the final aim that should be accomplished at the end of the learning process in school. The model also highlights the idea that learners are overstrained by a sudden change from TDL to SDL. For facilitating SDL step by step, he designed a model which helps teachers to facilitate SDL successfully (1991).

Table 2

The Staged Self-Directed Learning Model

Stage	Student	Teacher	Examples
Stage 1	Dependent	Authority Coach	Coaching with immediate feedback. Drill. Informational lecture. Overcoming deficiencies and resistence.
Stage 2	Interested	Motivator, guide	Inspiring lecture plus guided discussion. Goal-setting and learning strategies.
Stage 3	Involved	Facilitator	Discussion facilitated by teacher who participates as equal. Seminar. Group projects.
Stage 4	Self-directed	Consultant, delegator	Internship, dissertation, individual work or self-directed study group.

Note. Reprinted from "Teaching Learners To Be Self-Directed," by G. O. Grow, 1991, *Adult Education Quarterly, 41(3)*, p. 129.

Grow (1991) created four different stages for the role of the learners and teachers in different phases on the way to the learner's self-direction. The learner of stage 1 is a dependent learner and the teacher at this stage is an authority coach. This stage can be described as a total form of TDL. As learners progress to higher stages, they become more and more self-directed in their learning progress. That is why the number of the stage can be equalised with the degree of self-direction. Grow's theory does not claim that Stage 1 teaching is wrong in general, but that it is "bad only when it is applied to the wrong students or used to perpetuate dependency" (Grow, 1991, p. 130). Key for facilitating SDL and good teaching is that the stage of the learner matches the stage of the teaching provided by the teacher. Only then can the learner evolve toward more self-direction.

Grow describes stage 2 learning as something often known as "good teaching" (1991, p. 131). The fundamental goal of stage 2 is to prepare the learner for their path to self-direction (Grow, 1991). Stage 3 is the last stage before the students become truly self-directed. They "have skill and knowledge, and they see themselves as participants in their own education" (Grow, 1991, p. 133). The teacher becomes a "local guide and equipment supplier, not a coach driver on a packaged tour" (Fox, 1983, p. 157) and helps the students on their way to independence (Grow, 1991). Stage 4 being the stage where the students have high-self direction means that the learners "set their own goals and standards – with or without the help from experts" (Grow, 1991, p. 134).

Like stages on a staircase, the path to become self-directed must be taken step by step meaning the learners cannot jump straight from stage 1 to stage 4. Hence, it would be fatal to force the learners into SDL processes when they are on a lower stage in terms of the skills and abilities they acquired. Facilitating self-directed learning means that the learners must have the chance to develop the necessary skills and abilities for being self-directed progressively.

Logically, when the stage of teaching style differentiates from the stage the learner is on, problems are inevitable, which lead to a reduction of learning achievement. This is the reason why self-directed learning cannot generally be regarded as the best teaching method. It depends on the situation being the stage the learner is on.

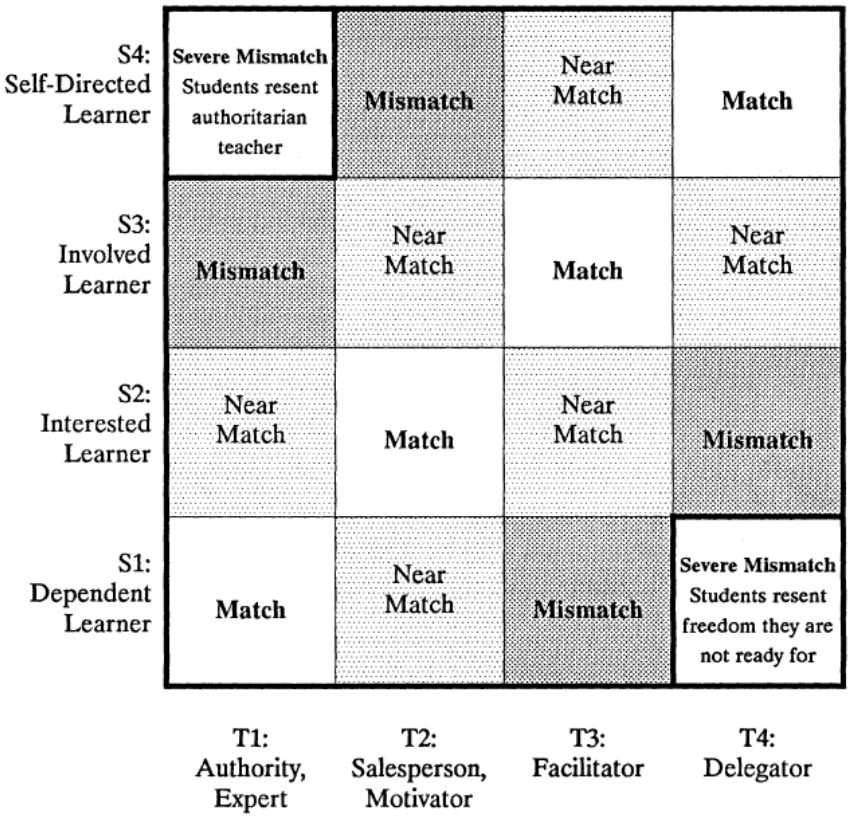

Figure 2. Match and Mismatch between Learner Stages and Teacher Styles. Adapted from "Teaching Learners To Be Self-Directed," by G. O. Grow, 1991, *Adult Education Quarterly, 41(3),* p. 137.

As seen in Figure 3, Grow (1991) differentiates between *severe mismatches*, *near matches* and *matches* (p. 137). A severe mismatch means that the stage where the learner and teacher are located on, is completely opposite (two other stages between them). A mismatch means that the learner is located on a stage that is two stages away from the teacher. A near mismatch means that the stage of the learner and the teacher is only one stage apart. This mismatch is the one which represents the least harm for the learner's learning process.

> "*The most severe problems occur when dependent learners are mismatched with non-directive teachers and when self-directed learners are mismatched with directive teachers*." (Grow, 1991, p. 137)

The goal of good teaching is a match between the stage the learners and the teacher are located on. The difficulty for the teacher is to find out on which stage their learners are.

> "Every stage requires balancing the teacher's power with the student's emerging self-direction" (Grow, 1991, p. 140).

The teaching style that may be good for one student might be bad for another. That is why stage 4 teaching is not necessarily better than stage 1 teaching. It depends on the learner's level of self-direction (Grow, 1991).

> "Good teaching does two things: it matches the student's stage of self-direction, and it empowers the student to progress toward greater self-direction. Good teaching is situational, yet it promotes the long-term development of the student" (Grow, 1991, p. 140).

In order to facilitate SDL in lessons, Grow (1991) developed a figure that can be used as a guideline for teachers to identify methods for the different stages that were already introduced.

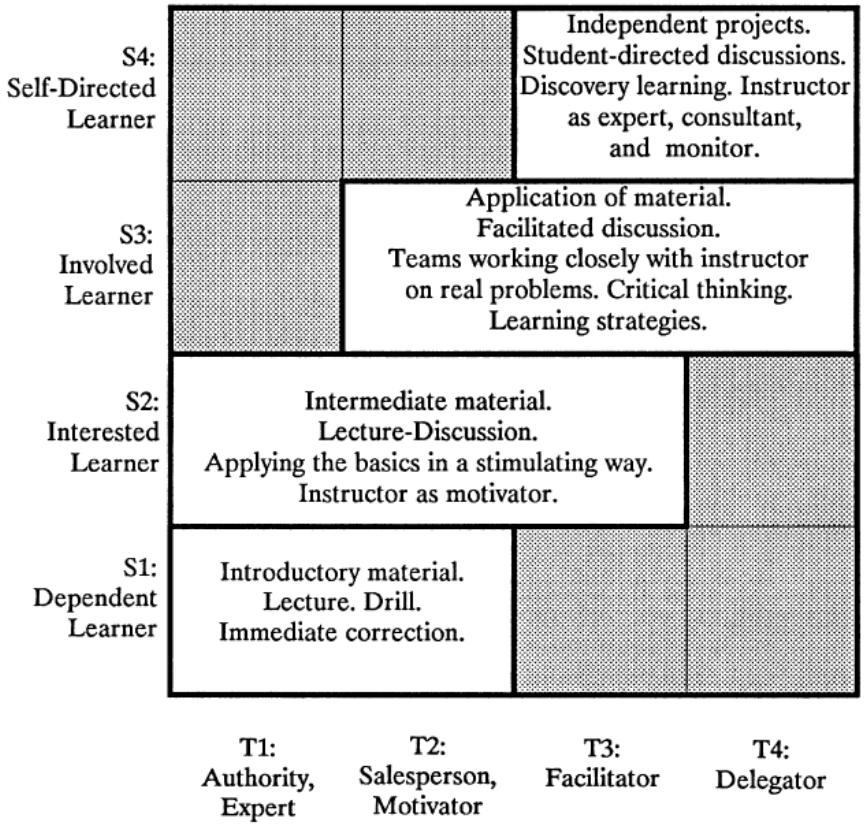

Figure 3. Applying the Staged Self-Direction Model to a Course. Adapted from "Teaching Learners To Be Self-Directed," by G. O. Grow, 1991, *Adult Education Quarterly, 41(3),* p. 143.

As can be seen in Figure 4, the level of self-direction increases during the ascending of the stages. While in the beginning, it starts with introductory material, it goes up to intermediate material, application of material and ends in the aim of independent projects where the learners learn completely self-directed. This guide can be used for teachers who

want to facilitate SDL in formal settings. Of course, first of they must analyse the learners to find out which stage they are located on.

As it became clear, facilitating SDL does not mean that every lesson should be self-directed from the start, but rather that lessons should become more and more self-directed over time because the learners develop different skills and abilities that are needed in order to learn self-directedly. The key conclusion that can be drawn from Grow's SSDL Model is that there is no generalised way of perfect teaching. Hence, the discussion about the way of learning should not be about TDL *or* SDL but about TDL *and* SDL.

2.8 Limitations of Facilitating Self-Directed Learning

2.8.1 Differentiation matters: Personality of the Learner

Fundamental to the way of teaching is the personality of the learners. In a class, all learners could be located on different stages in the SSDL Model. It could also happen than just a few are on a different stage then the others. This makes it difficult for the teacher to create lessons where nobody is bored and where every learner can develop skills and abilities to move on to the next stage. Also, there is a chance only one single learner is perhaps on stage 1 and the others are on stage 2 or 3, so the single learner would get penalised by stage 2 or even stage 3 methods. Because every learner is different, the facilitation of SDL is hindered. A teacher might be faced with some learners who are either not ready for SDL in terms of being located on a low stage in the SSDL Model or they just do not want to be self-directed, but instead be directed by the teacher.

Kirwan, Lounsbury and Gibson (2014) assume that the personality traits of the learners influence their self-directedness and not the other way around. Building on the works of Graziano and Eisenberg (1997), as well as Zimbardo and Gerrig (1996) they define personality as "a relatively complex set of traits that influence behaviour across time and situation" (Kirwan et al., 2014, p. 3).

The personality of a learner can be described in the Five Factor Model which consists of the constructs ***O****penness*, ***C****onscientiousness*, ***E****xtroversion*, ***A****greeableness*, and ***N****euroticism* (also called *OCEAN*). This model has been validated by different studies and is highly regarded by many researchers (e.g. De Raad, 2000; Digman, 1997, as cited in

Kirwan et al., 2014). Kirwan et al. (2014) constructed seven personality traits that are based on the big five traits being *openness*, *conscientiousness*, *emotional stability*, *agreeableness*, *extroversion* and the two narrow traits *work drive* and *optimism* (p. 5-6)

Table 3

Personality Traits

Personality Trait	Definition
Agreeableness	being agreeable, participative, helpful, cooperative, and inclined to interact with others harmoniously
Conscientiousness	being conscientious, reliable, trustworthy, orderly, and rule-following
Emotional Stability	overall level of adjustment and emotional resilience in the face of stress and pressure (conceptualized as the inverse of neuroticism)
Extroversion	tendency to be sociable, outgoing, gregarious, warmhearted, expressive, and talkative
Openness	receptivity and openness to change, innovation, new experience, and learning
Optimism	having an optimistic, hopeful outlook concerning prospects, people, and the future, even in the face of difficulty and adversity as well as a tendency to minimize problems and persist in the face of setbacks
Work Drive	being hard-working, industrious, and inclined to put in long hours and much time and effort to reach goals and achieve at a high level

Note. Adapted from "An Examination of Learner Self-Direction in Relation to the Big Five and Narrow Personality Traits," by. J.R. Kirwan, J. W. Lounsbury and L. W. Gibson, 2014, *SAGE Open, 4(2)*, p. 5-6.

They concluded that all personality traits, but extroversion correlates significantly with learner's self-direction (2014). This highlights the importance to take the learner's personality into account to achieve self-direction. Because every learner has a unique set of personality traits, their self-direction will be different. This makes it difficult for teachers

to facilitate self-directed learning because some learners are more self-directed than others. That is why the personality of the learners is a key limitation when trying to facilitate SDL in formal settings.

2.8.2 Conditions matter: The Institutional Framework

Another key limitation factor of facilitating SDL in formal settings is the institutional framework. Teachers are given a curriculum created by the responsible ministry of education. Depending on the way the curriculum is constructed, teachers are under constant pressure in terms of time and which topics they must include in their lessons.

Also, a usual lesson only lasts 45 minutes or sometimes 90 minutes. Facilitating SDL might require more time than that so the learners can really deepen themselves in the learning project. Right now, learners often have six different subjects a day which makes it almost impossible to have self-directed learning processes in all these subjects. Focus would get lost if the learners had to switch between several learning projects each day.

Another limitation factor for facilitating SDL are the political actors. According to the German Constitution called *Grundgesetz*, the policy of education is in the hands of each *Bundesland*. That is why every Bundesland differentiates in terms of education at school for example even in the school system. Even though there are regular conferences by the Ministers of Culture from each Bundesland (*Kultusministerkonferenzen*), it is difficult for them to find a productive consensus. Even if they did, the parliaments of the Bundesländer had to approve. In order to centralise education policy, a two-thirds majority in the German parliament (*Bundestag*) and in the legislative body of the sixteen Bundesländer at the national level (*Bundesrat*) is required. This seems to be highly unlikely because the Bundesländer do not want to give up one of their central political competencies voluntarily.

Facilitating SDL requires a similar education of the teachers and a similar type of teaching system in every school, so learners could achieve the highest stage in SDL and be prepared for the social contextual changes. It is a problem that the period of time students have to attend a Gymnasium differs from Bundesland to Bundesland. This means that some learners are under much more pressure, because they do have less time to get their degree than learners from another Bundesland. This also means that the teachers are under

more pressure and might have less time trying to facilitate SDL because the learners must be prepared for the final exams.

As mentioned before, the different personalities of the learners are a big limitation factor for the facilitation because the classes are quite heterogenous. Another big limitation is the fact that teachers are educated at universities and in their vocational education called *Referendariat* in a different way. As some lecturers are a supporter of SDL, others might be supporters of TDL.

This brings this thesis to the key problem being the fact that for SDL to work properly, the majority of the teachers at a school must be a supporter of self-directed learning and must be aware of the skills and abilities learners must develop to increase their level of self-direction as seen in the different stages of the SSDL Model. To achieve this the education of the prospective teachers must be similar. Learners who are used to being taught the "classic way" are overstrained with self-directed lessons, because they did not achieve the skills and abilities necessary for SDL. They would be on stage 1 or 2 of the SSDL Model. This can be seen in the mismatches between the stages of the teacher and the learners which results in failure and not success.

An example would be a supporter of SDL, who wants his students to be self-directed, but all their colleagues teach in a teacher-directed way. This means that the learners would be used to a TDL process and they might be overstrained in a SDL process, because they never had the chance to move up the stages in the SSDL Model to become more self-directed. In order to facilitate SDL, teachers must be well trained for it and they must want to do it. Grow (1991) points out that "[s]tudents have varying abilities to respond to teaching that requires them to be self-directing" (p. 126). Thus, the teachers must be aware that they teach heterogeneous classes where every student has their own strengths and weaknesses.

Grow's (1991) Staged-Self-Directed-Learning Model is a model that is supposed to be a guide for teachers in order to give the learners the chance to become more self-directed. Nonetheless the personality of the learners limits the facilitation of the SSDL Model. In the following, the method of the observations at the German Gymnasium, their analysis, the method of the interviews as well as their contexts will be explained.

3. Method

The observations were taken at a German *Gymnasium* in Rhineland-Palatinate. A Gymnasium is a type of school where the highest educational degree in Germany called *Abitur* can be achieved. This degree allows students to attend every university in Germany (unless it is restricted by a *Numerus Clausus*) and it is also required by an increasing number of vocational education careers. Before attending a Gymnasium, a student must graduate from elementary school which takes four years. At every Gymnasium in Rhineland-Palatinate, students must attend the Gymnasium for almost nine years (called *G9*) to get their Abitur. In some other Bundesländer, students can get their Abitur in eight years (*G8*). This is different between the Bundesländer and sometimes even in the Bundesland itself, because educational policy in in the hands of the government and parliament of each Bundesland.

This thesis covers the observations of social studies (grade 11 and 12), chemistry (grade 9), natural science (grade 6) and MINT lessons (grade 6). Two of the social studies lessons in grade 11 and two in grade 12 were analysed. Furthermore, one chemistry lessons, two natural science lessons, two lessons where natural science was combined with ITG and two MINT lessons were analysed. The observations of the MINT lessons were not taken in the same class, but they were analysed together in one table due to the similarity of the findings.

MINT is completely voluntary for the students, so it is interesting to see as to what extent this subject differentiates from the others in terms of the implementation of SDL in regards to the idea that it is expected that the learners are more motivated because they might have chosen it on purpose. Of course, it cannot be ruled out that some parents told their children to attend MINT classes. Also, natural science lessons that were combined with ITG (informatics and technology) were observed in grade 6. The analysis of these observations was done in a deductive qualitative way. Knowles' (1975) process elements of SDL and TDL (see Appendix A) including his assumptions about the learner's motivation (p. 60) were used as categories to match the observations. Furthermore, a new category being *the role of the teacher in the learning process* was added in order to differentiate between learning instructors and learning advisors. Thus, there are nine categories the observations of the lessons were matched to, so it can be evaluated, how self-respectively teacher-directed the observed lessons were.

Moreover, the teachers of the observed lessons were interviewed, which has been written down, and their statements were analysed in a thematic qualitative way. Compared to the analysis of the observations of the lessons the interviews were inductively matched to themes, so the selection of the themes is based on the statements of the teachers and not the other way around. There are two main themes being the *institutional framework* and the *learners*. The institutional framework was divided in three sub-themes being the *curriculum*, *length of lessons* and *evaluation*.

In this thesis, Teacher A represents the teacher, who teaches social studies in grade 11. The one who teaches it in grade 12 is called Teacher B. Teacher C teaches chemistry and MINT as well as natural science and ITG and natural science combined.

Social Studies

Social studies is a subject which includes politics, sociology and economics. It is a socio-scientific subject. In the German *Oberstufe* – from grade 11 upwards – it can be chosen as a *Leistungskurs* which means that a student has the subject four times a week. A Leistungskurs in grade 11 and one in grade 12 were observed. Both classes had different teachers. The lessons in grade 11 were attended by 12 students, the ones in grade 12 by 16 students.

Chemistry

Chemistry is a natural science subject about elements and different compounds consisting of atoms, molecules and ions. Two chemistry lessons in grade 9, each with an amount of 20 students were observed. In this grade students must attend chemistry lessons two times a week.

MINT

MINT standing for **m**athematics, **i**nformatic, **n**atural science and **t**echnology is a subject, learners can attend voluntarily. Because there is no curriculum for this subject, the teachers are not bound to specific targets that were set by political actors.

Natural Science/ITG

Natural science is a subject which includes biology, chemistry and physics. At a German Gymnasium, students attend natural sciences lessons from grade five to eight. Afterwards biology, chemistry and physics are taught separately. ITG is a subject which involves **i**nformatic and **t**echnology and which can be combined with natural science. Because of that, during the observations the teacher often decided whether the focus of a lesson would be more on natural science or on ITG. The same class in pure natural science lessons and lessons where natural science and ITG were combined were observed which allows to compare the two in an analysis.

4. Results

Social Studies

Grade 11

The social studies lessons in grade 11 were teacher-directed which can be seen in the fact that every of the introduced elements were teacher-directed (see Appendix B). The climate was judgemental which could be observed by admonishments when the learners did not do what Teacher A expected them to do. The planning was done primarily by the teacher as well as the diagnosis of needs. The teacher told the learners what the learners were supposed to achieve in a lesson, so the setting of goals was done by the teacher, too. Mostly, the lessons consisted of content units where the learners sometimes could choose from different exercises which were all planned by Teacher A. The topic of the lessons can be found in the curriculum of a Leistungskurs in social studies. The learning activities were mostly working sheets the learners had to work on. After that, the teacher evaluated the work of the learners. The learners were mostly driven because they had to do what Teacher A wanted them to do in order to get good grades and not to be punished by getting bad grades from their teacher.

The role of the teacher in the learning process was central and often the one of a learning instructor. Teacher A also acted as a learning observer but even though acting as an observer the teacher gave a clear task beforehand and expected specific results. The particularity of social studies compared to other subjects is the aim that the learners render an own judgement. Even though, most of the time the lessons were TDL, the learners still

got the chance to render their own judgement. Because often in social studies there is not one correct judgement, this can be regarded as a self-directed learning element.

Grade 12

The lessons in this class were not that different compared to the lessons in grade 11 (see Appendix C). Eight of the nine elements were analysed as being teacher-directed. The element *role of the teacher in the learning process* was mostly analysed as being teacher-directed because Teacher B acted as a learning instructor in the planning and the discussion of the lessons. Nonetheless, Teacher B was a learning observer in the learning process which was matched to SDL, thus an aspect of SDL was found.

Even though the two classes were taught by two different teachers, Teacher A told that in the vocational training to become a teacher the teacher received a lot of tips from Teacher B. The resemblance of the teaching styles could be observed well. The climate was formal, authority-oriented and judgemental. Teacher B also primarily planned the learning process, set the goals for the learners and told them the diagnosis of needs. Often, the lessons were a logical sequence where the end of a lesson was continued in the following lessons. For the learners, the primary form of tasks was assigned readings. It could also be observed that most of the learners were driven by the possibility of external rewards and punishments rather than internal curiosity. The teacher often acted as a learning observer for the tasks that were given to the learners. But because Teacher B planned the tasks, the teacher was an instructor in planning and the discussion of the tasks. That is why the Teacher B was central in the learning process even though it cannot be overlooked that the teacher often did not interfere while the learners worked on the tasks that were given to them.

Chemistry

The observed chemistry lesson was teacher-directed because eight of the nine elements were purely matched to TDL. Only in the climate of the lesson, one observation was matched to SDL. The other two observations in this element were matched to TDL (see Appendix D). Most of the time, the climate was authority-oriented and the lessons were planned primarily by Teacher C. The diagnosis of needs and the setting of goals were also made by the teacher, as well as the designing of the learning plan. Assigned readings and

work sheets were the normal way of learning. This is typical for teacher-directed learning. Teacher C evaluated the results. The learners were not driven by internal curiosity but by external rewards and punishments by the teacher. In general, it could be observed that the teacher had the central role in the learning process as a learning instructor.

MINT

These lessons were completely contradictory to every lesson that has just been described. It was self-directed because every element was matched to SDL (see Appendix E). The climate was mutually respectful, and the planning was mostly done by the learners themselves. The learners had to diagnose their own needs themselves, but of course they could ask Teacher C anytime so the teacher would come and help the learners. Teacher C just set the superordinate goal being that the learners should be able to present their projects, but the learners set the goals for what they wanted to achieve in this project. The learning activity was a project where the learners could choose quite freely what they wanted to do. The evaluation of the projects was not done primarily by the teacher but rather by mutual assessment. The learners gave a feedback to the person who presented their project and tips for what they could have done better. The learners were mostly driven by internal incentives and curiosity. Because the subject was chosen voluntarily, the teacher could not threaten the learners with external punishments. It could hardly be observed that any learner took advantage of the freedom that was given to them in this lesson. Teacher C had not the central role in learning process but was a learning advisor who watched the learners do their projects and was ready to answer questions and help the learners any time if necessary. All in all, the MINT lessons can be described as a nearly pure embodiment of self-directed lessons which differentiated from many observed lessons in a great deal.

Natural Science

The observations for two natural science lessons in the same class with the same teacher were analysed. In one of them, there was a classic exam that was not included in the results of the observations. But it can be said that of course an exam is teacher-directed because the teacher plans the tasks, which in natural science often only have one correct answer. It was not possible to assign the natural science lessons to solely TDL or SDL,

because they were a mix of both the concepts. Only the elements *Planning, Diagnosis of Needs, Setting Goals and Designing a Learning Plan* were matched to TDL. The element evaluation and learner's motivation were matched to SDL. The other three elements were a mix of both TDL and SDL (see Appendix F).

Sometimes, the lessons were authority-oriented and judgemental when Teacher C was strict, but other times the learners were observed to be mutually respectful which is indicated by the fact that they helped each other. The planning for an experiment, Teacher C had planned beforehand, was observed in which the teacher guided the learners towards the planning. Of course, it was not self-directed because the teacher had a specific experimental set-up in mind, but the learners were not just told what to do, instead the teacher guided the learners towards it with specific questions. The diagnosis of needs was told the learners by Teacher C and, as already mentioned, the teacher planned the experiment beforehand, so the learning plan was already set by the teacher. The teacher let the learners repeat the last lesson which was teacher-directed but did not give them much tips, so the learners had to complement one another. They had to organise the experiment themselves so the execution of it was self-directed. Whereas Teacher C was a learning instructor in the planning, the teacher was a mere advisor in the execution of the experiment. Teacher C observed the learners and helped them when they needed support, but during the experiment the teacher was not central in the learning process. There was even a time when Teacher C left the class to get some material. Hence, during that time the learners executed the experiment without the teacher even being present.

The learners were observed to be curious. They were driven by internal incentives and only one learner was not behaving well during the execution of the experiment. Most of the learners experimented self-directedly and independently. Frequently, they sought the teacher's help.

In sum, it can be said that the natural science lessons were a mix between teacher- and self-directed learning because elements of both learning styles could be found. But there are more two more elements that were purely matched to TDL than to SDL.

Natural Science/ITG

Two lessons where Teacher C combined natural science and ITG were analysed. These lessons were self-directed because every observation was matched to elements of SDL

(see Appendix G). The teacher gave the learners the task to prepare a presentation about a biological organ on their own. Because Teacher C just set a big frame, the learners could plan it and diagnose their needs in a self-directed and independent way. Mostly, the climate was mutually respectful and supportive because the learners helped each other and listened attentively when someone presented a project. One group did not communicate and understand each other well, but Teacher C mentioned that this is reasoned in the fact that the teacher deliberately let two learners work together because on the one hand one learner would be really intelligent but lacked social competences, which might improve while working with the other student who on the other hand could increase his knowledge by working together with the very intelligent learner. Thus, Teacher C's aim was to help both learners. The learners of the class set their goals on their own. Just the frame in terms of time was set by Teacher C. Because the learners had many choices which biological organ they wanted to present, they designed their own learning plan. The learning activity was of course self-directed as well, because it was an inquiry project. The evaluation was done by both the teacher and the learners. They both gave the one who presented tips and a constructive feedback. Once, the teacher was even overwhelmed by the project they presented and was very eager to find out how they did it. The teacher was a learning advisor who just gave the learners a frame which they could operate in. After that, Teacher C observed the learners working independently and self-directedly. The teacher did not have to intervene into the learning process very often and was ready to answer the questions the learners might have. Internal incentives and curiosity of the learners could be observed. They seemed to be highly motivated. To sum it up, it can be said that the natural science/ITG lessons were self-directed and the teacher became a learning advisor instead of a learning instructor.

Teacher A

After the observations of the lessons, Teacher A was interviewed (see Appendix H). The important statements are matched to the describes themes (see Appendix K). Teacher A emphasised that the curriculum pressurises the teacher, because there is not much time to do what the curriculum demands. From Teacher A's point of view the schedule of the curriculum could only work with an extraordinary good class. For Teacher A, the curriculum is perhaps to open in terms of the way the topics should be taught. It was underlined that sometimes lessons must be "functional" in order to prepare the learners for the

upcoming exams that are institutionally compulsory. Teacher A pleaded for a mix between SDL and TDL, because in the teacher's opinion learners would not want to get bored.

Teacher B

Teacher B was interviewed as well (see Appendix I). The important statements are matched to the themes (see Appendix L). Teacher B emphasised that the curriculum still gives the teachers some room for different kinds of teaching. As well as Teacher A it is highlighted that the curriculum pressures the teacher in terms of time of the schedule. This would lead to more strict teaching methods. The pressure would make it difficult to participate in a SDL project, because other topics could not be taught and learnt. But Teacher B mentioned that there are topics that the teacher teaches even tough, they are not in the current curriculum anymore.

Teacher B was sceptical of SDL because there would be a high chance of freeriding. In the teacher's opinion, TDL would be faster and more efficient than SDL. Furthermore, in SDL lessons it would be hard for the teachers to identify obstacles that are in the learner's way because a class is very heterogenous. Teacher B did not like that classic teaching methods that have been practised for a long time are generally criticised. SDL would be exhausting for learners that is why a day at school should not be completely self-directed. The teacher told a story about a learner who came from a *Waldorfschule* – a type of school where self-directed learning is normal – who told that for some learners it worked but others freerode and took advantage of their freedom. It was highlighted that the teacher already got good feedback for "classic lessons".

Teacher C

The statements of the teacher can be seen in Appendix H. They were matched to the describes themes (see Appendix M). Teacher C explained that the curriculum of the subject natural science would allow SDL. It would even be instructed in form of a project. The curriculum was called an open curriculum. But even though the curriculum is not a schedule for every lesson a year, Teacher C also highlights the pressure in terms of time because lessons would get cancelled due to for example field trips. Also, in the teacher's opinion, the clientele of the learners has got worse over the last years. The high number

of learners in a class would also hinders the schedule of the curriculum, and thus SDL. Because MINT has no curriculum as a voluntary subject, SDL can be facilitated.

Teacher C criticised the length of lessons of only 45 minutes. From the teacher's point of view, SDL could not be facilitated if learners must switch between different SDL projects every lesson. Also, evaluation of the learners in SDL lessons would be difficult under the current institutional settings. Teacher C praised SDL because it could increase the learners' motivation, but not every topic would be fit for SDL. SDL would need more time than TDL but would be more efficient. It was pleaded for a mix between the both learning theories, because learners would not learn everything in the same way. The success of SDL would depend on the learning situation and the learners' age. If they get older, SDL would be more successful. But it was mentioned that in the reality SDL would get less when the learners grow older. Teacher C answered the question why the observed chemistry class was taught in a teacher-directed way that they had not achieved the skills and abilities necessary to learn in a self-directed way. The teacher also pleaded for a development of self-direction step by step. Learners should learn and accomplish general strategies to solve problems step by step.

5. Discussion

The results of the observed lessons clearly show a huge difference between the different subjects. Whereas the chemistry and social studies lessons were teacher-directed, the natural science combined with ITG and the MINT lessons on the contrary were self-directed. The pure natural-science lessons were a mix between process elements of teacher- and self-directed learning. Because Teacher C was the only teacher that was observed in different subjects, it is central to find out why Teacher C's lessons differed from the ones of Teacher A and B.

Teacher C claimed to be a big supporter of SDL but criticised the institutional framework in terms of the 45 minutes length of normal lessons. As written above, Teacher C said that the curriculum of natural science allows for SDL and that it is not as detailed as it used to be which allows the teacher to do more SDL. In Teacher C's opinion the curriculum is not supposed to cover all lessons so the teachers ought to have some lessons where they can decide what to do which also allows for SDL. But Teacher C said that due to

cancellation of lessons, this is irrelevant in the daily life at school. In pointing out that the clientele of the learners in Gymnasiums became worse over the years, Teacher C indirectly criticised the educational policy of Rhineland-Palatinate. This also became clear when Teacher C criticised the huge numbers of learners in class which obviously makes it more difficult to facilitate SDL. It became clear that Teacher C is a supporter of SDL when it was said that SDL could increase the learner's motivation, which fits with Knowle's statements, but that it must be linked to the subject of the lessons. Teacher C did not think that every subject of a lesson can be taught in a self-directed way. Natural science would allow SDL in terms of the explanation of phenomena which can be solved and explained by the learners in a self-directed way. Teacher C's assumptions supported the observations of the natural science lessons. The learners were given an opportunity to explain a phenomenon themselves, but the framework was set by Teacher C. Following these statements, it is no surprise that the natural science lessons were quite self-directed.

Teacher C highlighted the special feature of MINT in terms of not having a curriculum. For the teacher it was surprising that many of the colleagues were deterred by the fact that there are no real guidelines for MINT lessons, so Teacher C had to construct some guidelines for the other teachers. This clearly shows that teachers are often not prepared for SDL. As a supporter of SDL, Teacher C enjoyed the space given by not having a curriculum in MINT which results in pure SDL lessons.

As already described, the natural science/ITG lessons were self-directed and Teacher C told that ITG is about to be cancelled and become MINT which would mean that the SDL lessons might decrease because MINT is a voluntary subject. This clearly underlines the institutional framework as a limitation factor for facilitating SDL. If the ones who decide about the school system decide to cancel a subject, it is hard to prevent it from happening. Teachers are bound to the institutional setting they are involved.

Teacher C assumed that SDL needs more time, but that it would bring more success than TDL. The teacher pleaded for the mixture of both of SDL and TDL regarding the learning situation and age. This goes hand in hand with the SSDL Model where the level of self-direction increases over time. The fact was criticised that SDL in schools is reduced when the learners become older instead of strengthening SDL as the core teaching principle. This is a contradictory fact to the idea of the SSDL Model where the learners are supposed to become more and more competent in being self-directed. Thus, they are supposed to move up stages in terms of their self-direction and not down.

As seen in a Leistungskurs in grade 11 and 12, at the observed German Gymnasium this does not seem to be the fact because these lessons were teacher-directed. It is interesting to find out why the chemistry lessons were not self-directed. Teacher C claimed that the learners in that class were not ready for SDL and that it is sure that SDL lessons would not work with them. Teacher C indirectly referred to the SSDL Model without naming it by saying that the necessary skills and abilities for SDL had to be learnt step by step but that the learners from the chemistry lessons have not learnt them yet. As already written, Teacher C also criticised the institutional framework given by politics in terms of the length of one lesson and the fact that the learners attend several subjects a day so it would be hard for them to focus on one project.

The social studies lessons were all teacher-directed. As written above, Teacher B explained to be a supporter of teacher-directed learning, because in the teacher's opinion, school must prepare the learners for attending university because lectures at universities would be even more teacher-directed. This argument can be questioned by the fact that the teaching style of universities is changeable, too. The way it was spoken about university, it seemed like Teacher B did not even question the way universities are now. This underlines the limitation factor of facilitating SDL being the fact that different universities in Germany teach in completely different ways. For learners to be ready to adapt to social contextual changes, it is not enough to just facilitate SDL in schools. It must be facilitated at universities as well.

Teacher B raised concerns about the fact that some learners could be free riders in phases of self-directed learning. To link this with the theory of SDL, it can be assumed that the ones who freeride and take advantage of SDL do not have the personality to fit for SDL or are overstrained due to being on a lower stage on the SSDL than the teacher is. Also, a reason why Teacher B insisted on TDL is that it would have a higher efficiency than SDL. This is contradicting to Teacher C's statement who regarded SDL as more efficient when done correctly. From Teacher B's point of view, SDL is difficult to facilitate because it would be hard for the teacher to see the obstacles in the learners' way during the learning process due to the heterogeneity of the class. This statement links to one of the limitation factors of SDL being the differentiation of the learners. Teacher B was an opposer of SDL and a maintainer of TDL which becomes clear by the statement that the teacher does not like that "learning methods that have been used for decades are being criticised across-the-board". In comparison to Teacher C, it was said that a day at school which is completely self-directed would be too stressful for the learners because they

needed the chance to take a breath. Teacher B relied on the experience that the teacher had already got good feedback for "classic lessons" being teacher-directed lessons. The pressure in terms of time teachers have due to the construction of the curriculum was pointed out. This highlights another institutional framework of the curriculum being time which hinders the facilitation of SDL. It also becomes clear that SDL cannot possibly be facilitated if the teacher does not support it. It just would not work.

Teacher A supported the last argument. It was also said that Teacher A would feel the pressure in terms of time that is given by the curriculum. On the one side Teacher A stated that the contents of the curriculum could only be done in time by extraordinary classes. On the other side the teacher highlighted that the curriculum is quite open in terms of the choice of certain topics. In Teacher A's lessons, one big topic was not written down explicitly in the curriculum, but it could be interpreted in. This shows that sometimes, teachers have some freedom in choosing what they will teach the learners. As mentioned before, the phase in social studies lessons where learners render an own judgement about a political problem is supposed to be made independently and self-directedly. Teacher A underlined that.

But despite of these specific phases, Teacher A's lessons were teacher-directed. Because of the curriculum and the exams, it was claimed that sometimes lessons must be "functional" which can be assumed as being teacher-directed. Teacher A advocated a mix between TDL and SDL, because learners would not want to get bored and sometimes, they would be glad if the lessons are teacher-directed. This was the same argument Teacher B made.

It can clearly be seen that Teacher A and B are more alike than Teacher C. As written before, during his vocational training Teacher A had got a lot of tips from Teacher B which could be observed in a similar teaching style. This underlines one of the limitation factors of facilitating SDL in formal settings being the fact that teachers are educated differently.

Whilst in the observations Teacher C turned out to be a big supporter of SDL, Teacher A and B are rather a supporter of TDL. If the SSDL Model is to succeed in order to facilitate SDL, teachers must be educated in a similar way. If political actors do not aim for the facilitation of SDL or the educational policy is not centralised SDL is hard to be facilitated due to the differentiation of the vocational training of teachers.

6. Conclusion

It became clear that there a lot of limitation factors for facilitating SDL at a German Gymnasium being the institutional framework, the personality of the learners and the willingness of the teacher to support SDL. If the teacher does not want to facilitate self-directed learning, it will not happen. Chances can be seen in the great results of the learning processes in especially the MINT lessons. Every learner was driven by internal curiosity and the teacher seemed to be greatly delighted by the results of the learning project. It was evident that SDL can work if facilitated properly. Main barriers are the institutions being the ministry which must aim for the facilitation of SDL so it can be successful. That is why the education for teachers at universities must increase their focus on giving the prospective teachers the opportunities to evolve the skills and abilities necessary to implement SDL. Only if the teachers are ready and supporters of SDL, it can be facilitated. As seen in the results, there are teachers who oppose SDL which might have been caused by their education at university and in the Referendariat. A fundamental problem is that education policy lies in the hand of the 16 different Bundesländer which is politically difficult to change. If the teachers are up for facilitating SDL, the SSDL Model can give them a guideline for the facilitation. But a central problem is that teachers rely on the groundwork of other teachers who have got to be supporter of SDL as well if the SSDL Model is to be successful.

A limitation of this thesis is the fact that the observed teachers offered this chance voluntarily and were not forced by the headteacher to do it. That is why there is a good chance that teachers were observed who either just wanted to be friendly in order to help the research of the thesis and/or are self-confident and experienced and think of themselves as "good" teachers. That is why it cannot be ruled out that the samples might be biased, and they might not reflect the daily life at a German Gymnasium. Thus, these observations cannot be regarded as a generalised insight of a German Gymnasium. Also, because lessons at a school in Rhineland Palatinate were observed, the observations might be completely different in another Bundesland, since the education policy is in the hand of each German Bundesland.

Another limitation factor is that only a few different subjects were observed. There are much more subjects in school being maths, physics, biology, arts, music, geography, religion, philosophy, sports, history and different languages that could not be analysed so it cannot be ruled out that different observations could have been made in them. Also, it

cannot be ruled out that other teachers in the observed subjects would teach in a completely different way. For example, another social studies teacher might be the biggest supporter of SDL and another natural science teacher might not be.

These aspects demonstrate the fact that these observations are just a sample and an impression of the way of teaching at a German Gymnasium and cannot be generalised for every other Gymnasium. However, they give the reader an insight of daily life at a specific German Gymnasium which is the start for further studies.

That is why observations at Gymnasiums in other Bundesländer would be gainful. The observations of this thesis could mark the base of further researches and they could function as a reference to compare to. In addition to this, the explanatory power of this thesis could be increased by the observations of other subjects than the ones which were observed in this thesis. Furthermore, instead of analysing lessons, the education for teachers at universities could be observed and analysed as well to diagnose in how far universities teach prospective teachers to make their lessons self-directed. If SDL is facilitated properly, it would help learners to adapt better to social contextual changes in the world after school. As shown in the SSDL Model, the ultimate goal is that lessons are completely self-directed. Thus, TDL should not be despised, but instead be regarded as a necessary way of teaching on the path to more self-direction.

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Appendices

Elements	TDL	SDL
Climate	Formal Authority-oriented Competitive Judgemental	Informal Mutually respectful Consensual Collaborative Supportive
Planning	Primarily by teacher	By participative decision-making
Diagnosis of needs	Primarily by teacher	By mutual assessment
Setting goals	Primarily by teacher	By mutual negotiation
Designing a learning plan	Content units Course syllabus Logical sequence	Learning projects Learning contracts Sequenced in terms of readiness
Learning activities	Transmittal techniques Assigned readings	Inquiry projects Independent study Experiential techniques
Evaluation	Primarily by teacher	By mutual assessment of Self-collected evidence

Appendix A. Comparison of the Process Elements of Teacher-Directed and Self-Directed Learning. Reprinted from "Teaching Learners To Be Self-Directed," by G. O. Grow, 1991, Adult Education Quarterly, 41(3), p. 129.

Element	Observation	Characteristic	TDL or SDL
Climate	Lehrkraft hat zentrale Rolle, die SuS bei Fehlverhalten ermahnt	Judgemental	TDL
Planning	Lehrkraft erklärt zeitlichen Ablauf der Stunde Lehrkraft fragt SuS, wer welchen Auftrag machen möchte (verschiedene Optionen, die von Lehrkraft jedoch vorgegeben sind) → teilt SuS nach ihren Präferenzen ein Lehrkraft gibt Hausaufgabe in Form eines Arbeitsblattes auf → plant somit schon für nächste Stunde	Primarily by teacher	TDL
Diagnosis of needs	Lehrkraft gibt SuS Materialien, die benötigt werden	Primarily by teacher	TDL
Setting goals	Lehrkraft gibt Ziel der Unterrichtsstunde an	Primarily by teacher	TDL
Designing a learning plan	SuS können zwischen verschiedenen Aufgaben wählen, sind jedoch fest an Aufgabe gebunden → Themenfeld lässt sich klar im Lehrplan verordnen	Content unit	TDL
Learning activities	SuS bearbeiten von der Lehrkraft vorgegebene Aufgaben eines Arbeitsblattes und müssen diese auf Overheadprojektor vorstellen	Transmittal techniques	TDL
Evaluation	Lehrkraft gibt Vortragenden ein Feedback, wie gut der Vortrag war Lehrkraft beobachtet Vorträge und ist jederzeit bereit, in Vortrag einzugreifen, um etwas zu ergänzen → greift bei Fehler kurz ein	Primarily by teacher	TDL
Role of the teacher in the learning process	Zentrale Rolle, die den SuS bestimmte Aufgaben gibt steht im Lernprozess bei Fragen zur Verfügung → geht rum und ist jederzeit ansprechbar Lehrkraft fragt bei SuS nach, wie weit sie schon sind, um Zeitplan einzuhalten Lehrkraft geht durch Klasse und hilft bzw. gibt Tipps → hilft nur beim Nötigsten → appelliert an Selbstständigkeit Lehrkraft stellt gezielte Fragen an SuS → lenkt das Unterrichtsgespräch mit SuS und somit den Lernprozess	Learning instructor Learning observer but wants a certain result	TDL
Learner's motivation	Viele SuS führen Privatgespräche vor Bearbeitung der Aufgaben SuS unruhig als Hausaufgabe ausgeteilt wird	External rewards and punishments	TDL

Appendix B. Observations of Social Studies in Grade 11.

Element	Observation	Characteristic	TDL or SDL
Climate	Lehrkraft mahnt bei Erklärung der Aufgabenstellung zur Ruhe Lehrkraft lässt SuS bei Bearbeitung der Aufgabe in Gruppenarbeit arbeiten Lehrkraft ruft bei Besprechung der Aufgaben SuS auf, obwohl diese sich nicht melden	Formal, authority-oriented and judgemental	TDL
Planning	Lehrkraft gibt SuS von ihr vorbereitete Aufgabe, die bearbeitet werden und nächste Stunde besprochen werden soll → SuS können frei entscheiden, ob sie es schon in der Stunde machen oder zuhause Lehrkraft plant Besprechung der Aufgabe der letzten Stunde für Unterrichtsstunde ein	Primarily by teacher	TDL
Diagnosis of needs	Lehrkraft gibt SuS Materialien	Primarily by teacher	TDL
Setting goals	SuS sollen Auftrag bis Anfang der nächsten Stunde fertig haben	Primarily by teacher	TDL
Designing a learning plan	Lehrkraft gibt SuS Auftrag, der in darauffolgender Stunde besprochen werden soll	Logical sequence	TDL
Learning activities	SuS bearbeiten vorgegebenen Auftrag	Assigned readings	TDL
Evaluation	Lehrkraft bewertet Ergebnisse der SuS	Primarily by teacher	TDL
Role of the teacher in the learning process	Lässt SuS bei Aufgabe selbstständig arbeiten lenkt Besprechung der Aufgabe durch gezielte Fragen und Aussagen sitzt bei Besprechung auf Tisch vor der ganzen Klasse leitet durch gezielte Impulse einen Fachbegriff her	Learning observor in the learning process Learning instructor in planning and discussion	Mostly TDL
Learner's motivation	nur zwei SuS beginnen mit Aufgaben → Rest führt Privatgespräche → Anzahl der SuS, die an Aufgaben arbeiten, steigt auf über die Hälfte → SuS wechseln jedoch immer wieder zwischen der Bearbeitung der Aufgaben und Privatgesprächen hin und her Bei Besprechung der Aufgabe machen einige SuS gut mit und wirken motiviert → viele beteiligen sich jedoch nicht und sind unmotiviert	External rewards and punishments	TDL

Appendix C. Observations of Social Studies in Grade 12.

Element	Observation	Characteristic	TDL or SDL
Climate	Lehrkraft klatscht in Hände, um für Ruhe zu sorgen Lehrkraft sorgt für Aufmerksamkeit ein Schüler geht zu anderen SuS, um sich gegenseitig zu helfen Lehrkraft sorgt für Aufmerksamkeit	Authority-oriented Collaborative, supportive Authority-oriented	TDL SDL TDL
Planning	Lehrkraft hat Stunde vor Unterricht geplant und führt diese genauso durch	Primarily by teacher	TDL
Diagnosis of needs	Lehrerin fragt nach Unklarheiten	Primarily by teacher	TDL
Setting goals	SuS sollen Arbeitsblatt in gewisser Zeit bearbeiten	Primarily by teacher	TDL
Designing a learning plan	von Lehrkraft geplant	Content units Course syllabus	TDL
Learning activities	einige SuS fangen mit aufgegebenem Arbeitsblatt an; andere schwätzen Großteil der SuS scheint an Aufgabe zu arbeiten SuS sollen etwas abschreiben Lehrkraft zeigt SuS einen Film	Assigned readings	TDL
Evaluation	Lehrkraft lobt SuS für ruhige Erarbeitung des Arbeitsblattes und Zusammenarbeit der SuS untereinander	Primarily by teacher	TDL
Role of the teacher in the learning process	Gibt SuS Aufgaben und steht bei Fragen zur Verfügung lenkt Besprechung des Arbeitsblattes	Learning instructor	TDL
Learner's motivation	bearbeiten Arbeitsblatt, weil sie es müssen einige fangen mit Arbeitsblatt an; andere schwätzen Großteil der SuS scheint an Aufgabe zu arbeiten viele sind unruhig wenig Privatgespräche wahrnehmbar sind während des Films sehr unruhig und unaufmerksam → schauen Film aufmerksam nach Ermahnung durch Lehrkraft	External rewards and punishment	TDL

Appendix D. Observations of Chemistry in Grade 9.

Element	Observation	Characteristic	TDL or SDL
Climate	SuS fragen Lehrkraft bzw. Mitschüler*innen bei Problemen eine Schülerin setzt sich neben eine Mitschülerin und hilft ihr SuS sind motiviert, führen keine Privatgespräche und stören nicht den Unterricht Lehrkraft möchte, dass SuS sich gegenseitig helfen SuS arbeiten eigenständig; helfen sich gegenseitig → keine Privatgespräche zu hören	Mutually respectful, collaborative, supportive	SDL
Planning	gibt Aufgabe für eigenständige Vorträge auf, bei der Lehrkraft nur hilft, die SuS allerdings eigene Ideen entwickeln	By participative decision-making	SDL
Diagnosis of needs	Lehrkraft geht rum und hilft bei Problemen; SuS entwickeln aber selbst, was sie für die Präsentation brauchen	By mutual assessment	SDL
Setting goals	SuS sollen, wenn möglich, eigenständige Arbeit am Ende der Stunde vorstellen → Lehrkraft gibt grobe Vorgaben für Zeitpunkt Fertigstellung der Präsentation; Vorgaben für Präsentation von Lehrkraft nur sehr grob formuliert → viel Spielraum für Schülerinnen	By mutual negotiation	SDL
Designing a learning plan	Lehrkraft gibt SuS einen grob umrahmten Auftrag, den sie eigenständig bearbeiten sollen	Learning projects	SDL
Learning activities	Erstellung einer eigenständigen Präsentation SuS arbeiten selbstständig, Lehrkraft nur als Beraterin	Inquiry projects Experiential techniques	SDL
Evaluation	Lehrkraft beobachtet und lobt das von einer Schülerin Erreichte Mitschüler*innen klatschen nach Präsentation →Schülerin dankt anderer Schülerin, die ihr geholfen hatte, die Präsentation zu machen	By teacher and by learners	SDL
Role of the teacher in the learning process	wird nur für gelegentliche Fragen und zur Unterstützung gebraucht; geht rum, hilft, unterstützt, berät und beant-wortet Fragen berät SuS und geht wieder durch Klasse, um nach und SuS mit Problemen bzw. Fragen zu beraten	Learning advisor	SDL
Learner's motivation	niemand nutzt die gegebenen Freiheiten aus → alle arbeiten an Präsentation bzw. helfen anderen, da manche schneller fertig sind als andere → arbeiten selbstständig → SuS helfen sich gegenseitig nur eine Schülerin, die kurz nichts macht und die gegebene Freiheit im Lernprozess ausnutzt, sich aber recht schnell an die Arbeit macht einige SuS sehr motiviert, ihr Ergebnis vorzustellen keine Privatgespräche zu hören	Internal incentives, curiosity	SDL

Appendix E. Observations of MINT in Grade 6.

Element	Observation	Characteristic	TDL or SDL
Climate	Lehrkraft ermahnt zum Teil SuS, die dazwischenrufen strengere Art bei Fehlverhalten (wie Zwischenrufe), nette Art bei Gehorsamkeit Lehrkraft klatscht in die Hände, um SuS, die ihr nicht gehorchen, dazu zu bringen, Befehl zu befolgen bei Wiederholung der letzten Stunde schwätzen nur wenige SuS Lehrkraft sorgt allein durch Mimik für Bewusstsein der SuS, dass sie leise sein sollen SuS helfen sich bei Versuch gegenseitig	Authority-oriented, judmental Mutually respectuful, collaborative, supportive	TDL SDL
Planning	Lehrkraft lässt Versuchsaufbau lehrergesteuert durch gezielte Fragen an SuS erarbeiten	Primarily by teacher	TDL
Diagnosis of needs	SuS sollen bei Versuch bestimmte Beobachtungen festhalten	Primarily by teacher	TDL
Setting goals	SuS sollen Versuch innerhalb einer Stunde schaffen	Primarily by teacher	TDL
Designing a learning plan	Versuch, den sich Lehrkraft vorher überlegt hat	Content unit	TDL
Learning activities	Lehrkraft lässt bei Wiederholung der letzten Stunde wichtige Aussagen von SuS erarbeiten, indem sie nacheinander drangenommen werden → gibt nur sehr wenig Input und Hilfestellung, sodass SuS selbst draufkommen gibt Hausaufgabe auf SuS müssen sich beim Experimentieren selbst organisieren	Transmittal techniques Assigned homework Experiential techniques	TDL TDL SDL
Evaluation	Lehrkraft schreibt Beobachtungskriterien für den Versuch an Tafel; diese sollen in der nächsten Stunde besprochen werden mit den Ergebnissen, die jede*r Schüler*in gesammelt hat	By mutual assessment of self-collected evidence	SDL
Role of the teacher in the learning process	leitet die Wiederholung der letzten Stunde und die Vorbereitung des Versuchs und geht während des Versuchs durch Klasse → beobachtet und hilft Ist am Pult und meist nur passiv am Lernprozess beteiligt → gibt einigen Gruppen Hinweise und ist bei Fragen sofort da holt einige Materialien aus anderem Raum und ist dadurch gar nicht anwesend	Learning instructor Learning advisor	TDL SDL
Learner's motivation	ein Schüler benimmt sich während des Versuchs daneben → die meisten SuS wirken jedoch beim eigenständigen Experimentieren sehr motiviert und arbeiten selbstständig mit gelegentlichen Fragen an Lehrkraft	Mostly internal incentives, curiosity	SDL

Appendix F. Observations of Natural Science in Grade 6.

Element	Observation	Characteristic	TDL or SDL
Climate	SuS hören bei Präsentationen der Projekte aufmerksam zu SuS arbeiten gut zusammen Ausnahme stellt eine Partnerarbeit dar, bei der es aufgrund unterschiedlicher Leistungsniveaus Probleme gibt → Lehrkraft beabsichtigt dies, um soziale Kompetenz des stärkeren Schülers und Fachkenntnisse des schwächeren Schülers zu stärken	Mostly mutually respectful, supportive	SDL
Planning	gibt SuS Auftrag, eigenständig eine Präsentation zu erstellen; das Thema ist in der Biologie auf Organe eingeschränkt, sodass SuS viele Optionen haben, was sie machen können	By teacher and learners	SDL
Diagnosis of needs	SuS entscheiden selbst, was sie brauchen	By learners	SDL
Setting goals	Lehrkraft gibt zeitlichen Rahmen für Präsentationen; das Produkt der Arbeit unterliegt allerdings den SuS	By mutual negotiation	SDL
Designing a learning plan	SuS entscheiden selbst, wie sie was machen	Learning project	SDL
Learning activities	SuS erstellen in Einzel- oder Partnerarbeit eine Präsentation	Inquiry project	SDL
Evaluation	Lehrkraft gibt Vortragendem ein persönliches Feedback → lobt Schüler SuS bewerten Präsentation des Schülers Lehrkraft ist höchsterfreut und -zufrieden über Präsentation Lehrkraft gibt zwei SuS Feedback und bezeichnet ihr Projekt als grandios; fragt, wie sie etwas bestimmtes geschafft haben, da Lehrkraft es selbst nicht wusste SuS hören aufmerksam Präsentation zu und geben Feedback findet Projekt von Schüler super und lobt dieses → gibt noch einen Vorschlag für eine Ergänzung und appelliert an andere SuS, Schüler ggf. dabei zu helfen	By mutual assessment of self-collected evidence	SDL
Role of the teacher in the learning process	Lehrkraft zuerst an Pult, geht dann durch Saal, steht bei Fragen zur Verfügung und beobachtet Lernprozess muss nur vereinzelt in den Lernprozess eingreifen sitzt auf Tisch in letzter Reihe und beobachtet Klasse und steht bei Fragen zur Verfügung	Learning advisor	SDL
Learner's motivation	arbeiten sehr selbstständig → keine Privatgespräche zu hören -arbeiten z.T. in unterschiedlicher Geschwindigkeit wirken sehr motiviert arbeiten motiviert eigenständig weiter an Projekt oder spielen ein Spiel o.Ä.	Internal incentives, curiosity	SDL

Appendix G. Observations of Natural Science combined with ITG in Grade 6.

Lehrkraft A sagt, dass der Lehrplan Zeitdruck erzeuge, da die von ihm vorgegebenen Stunden für ein Themenfeld zu knapp bemessen seien. Er betont, dass der Zeitplan des Lehrplans mit einer ausgezeichnet leistungsstarken Klasse vielleicht funktioniere, im Normalfall allerdings nicht. Dies führe dazu, dass die Lehrkräfte unter Zeitdruck die vorgegebenen Themen durchbringen müssen, um den Zielen des Lehrplans gerecht zu werden.

Die Lernziele des Lehrplans bezeichnet die Lehrkraft als offen. Lehrkraft A hat zum Beispiel den Fall *CETA* behandelt, der nicht explizit im Lehrplan stand, sondern reininterpretiert wurde. Laut Lehrkraft A hätte zum Beispiel auch die neue Seidenstraße gemacht werden können. Es wurde betont, dass der Lehrplan wäre vielleicht sogar zu offen wäre. Außerdem wurde gesagt, dass die Lehrkräfte sehr belesen sein müssen, um die offene Form des Lehrplans in guten Unterricht umsetzen zu können.

Nach Lehrkraft A‘s Meinung sei die Urteilsphase im Unterricht recht frei, da es Spannungsfelder ginge, bei denen es nicht die eine richtige Antwort gäbe. Lehrkraft A stellt heraus, dass sie gern eine Kontrolle im Unterricht hätte, da Kursarbeiten aufgrund des institutionellen Rahmens geschrieben werden müssen. Unterricht müsste deshalb aufgrund des Zeitdrucks manchmal einfach funktional sein. Es wurde betont, dass SuS nicht gelangweilt werden wollen und ist daher für eine Mischung von SDL und TDL. Lehrkraft A‘s Erfahrung nach seien SuS manchmal froh, wenn Unterricht zentrierter sei.

Appendix H. Data Collection. Interview with Teacher A.

Auf die Frage, wie viel Handlungsspielraum der Lehrplan der Lehrkraft gibt, antwortet Lehrkraft B, dass niemand den Lehrplan als „militärischen Drill“ ansehe. LZ im Lehrplan seien offen die Inhaltsaspekte jedoch zu detailliert, wodurch sich niemand genau daranhalten könnte. Demnach gebe es Handlungsspielräume. Lehrkraft B schaue im Lehrplan nach den vorgegebenen Stundenanzahlen für die Themenfelder, um einen Richtwert zu haben. Sie setze eigene Schwerpunkte, versuche aber jedes Thema äquivalent zu behandeln. Lehrkraft B sagt, der Lehrplan würde immer detaillierter werden. Außerdem wurde die Fachbegriffsliste des Lehrplans begrüßt. Da in Sozialkunde immer auch Aktuelles kommen muss, eignete sich der Lehrplan nur bedingt dafür. Lehrkraft B fände es gut, wenn Lehrplan mehr Zeit geben würde, denn die Stundenzahlen wären zu knapp bemessen.

Zeitdruck führe dazu, dass man recht strikt unterrichten müsse. Lehrplan mache es schwierig z. B. an einem Projekt teilzunehmen, das sehr selbstgesteuert wäre, da Zeitdruck zu hoch ist und dadurch andere Sachen auf der Strecke bleiben würden. Es würden z. B. immer mal Stunden ausfallen und deshalb fände sie es besser, wenn Lehrplan nicht so dicht gestrickt wäre. Lehrkraft B unterrichte z. B. weiterhin Themen, die sie als sehr wichtig empfindet, die aber nicht mehr im Lehrplan stehen. Lehrkraft begrüßt den kumulativen Aufbau des Lehrplans und wünscht sich mehr Kontinuität in Lehrplänen, denn diese würden oft sehr umstrukturiert werden. Lehrkraft B plädiert für mehr Anwendungsoptionen im Lehrplan. Lehrplan solle Pflicht- und Wahlbausteine haben.

Unterricht sei eher lehrergesteuert, da Schule auf Uni vorbereiten muss, in der durch Vorlesungen alles noch lehrergesteuerter ist, worauf die SuS vorbereitet werden müssen. Gruppenarbeiten in selbstgesteuerten Phasen könne immer zu Trittbrettfahren führen. Lehrkraft B erzählt von Schülerin, die von Waldorfschule kommt, die erwähnte, dass dies für SuS, die Freiheiten nutzen, gut wäre, andere es aber ausnutzen würden. Lehrkraft B berichtet von SDL Stunde, bei der manche die gegebenen Freiheiten ausgenutzt hätten. TDL sei effizienter und SDL langsamer und es wäre schwierig zu sehen, wo Hürden für SuS liegen, da Klassen heterogen wären. Die Lehrkraft begrüße es nicht, wenn klassische Lernmethoden, die schon sehr lange benutzt werden, pauschal kritisiert werden.

Sozialkunde erlaube durch Stellungsnahmen der SuS Freiheiten für SuS, da nicht nur ein outcome erwartet wird und Diskussionen im Vordergrund stünden. Normative Meinungen können nicht als falsch bezeichnet werden. Lehrkraft B findet, dass nur SDL auch sehr anstrengend für SuS wäre und dass es gut sei, dass es fächermäßig Unterschiede gebe. SDL über ganzen Schultag wäre schwierig, da SuS auch mal durchschnaufen müssten. Lehrkraft B sagt, SuS wären auch mal froh, wenn Aktivitätsniveau nicht immer so hoch ist. Sie bekam schon gutes Feedback für klassische Stunden, bei denen SuS sagten, sie hätten den Stoff wirklich kapiert. Lehrkraft B keine Freundin davon, wenn es nur noch eine Kompetenz- und keine Faktenorientierung mehr gäbe.

Appendix I. Data Collection. Interview with Teacher B.

Lehrkraft C sagt, dass der NaWi-Lehrplan SDL vorsehe und dafür Freiraum einräume. Dies werde zum Beispiel in Form einer Projektarbeit vorgeschrieben. Der Lehrplan sei im Vergleich zu früher sehr grob gehalten. Er sei offen und Lehrkraft wäre nicht so wie früher an Stunden gebunden. Außerdem solle der Lehrplan theoretisch nicht gesamte Stunden ausfüllen, sodass Lehrkraft Freiräume blieben und durch viele Themen, die nicht gemacht werden müssen, die Lehrkraft den Unterrichtsstoff variieren kann. Praktisch ist dies jedoch durch Stundenausfälle, schwierigeres Schülerklientel als früher und einer hohen Anzahl an Schülerinnen und Schülern schwierig und die Zeit sehr knapp bemessen. NaWi erlaube exemplarisches Arbeiten, was förderlich für SDL sei. Lehrkraft betont, dass NaWi SDL vor allem durch offene und von SuS geplante Experimente erlaube. NaWi sei durch Phänomene, die eigenständig gelöst werden können, prädestiniert für SDL.

Je mehr zentrale Vorgaben und genormte Tests von der Politik kämen, desto geringer werden Freiräume für Lehrkräfte. Die Lehrkraft macht deutlich, dass SDL die Motivation von einigen SuS erhöhen könne, aber dass dies an den Unterrichtsgegenstand gekoppelt wäre. Sie denke nicht, dass sich jeder Unterrichtsgegenstand für SDL eignet.

Laut Lehrkraft C sei eine 45-minütige Unterrichtsstunde zu wenig für die Umsetzung von SDL. Der institutionelle Rahmen durch sechsmal wechselnde Fächer am Tag mache es schwierig SDL erfolgreich umzusetzen, da sechs selbstständige Projekte gleichzeitig am Tag laufen würden. SDL sei mit der momentanen Schulform deshalb nur schwer zu vereinbaren. Lehrkraft C denkt, dass es nur der institutionelle Rahmen sei, der SDL verhindere, da bei einer selbstgesteuerten Stunde, die nur 45 min geht, fachlich nur wenig bei SuS hängen bleiben würde. Die Nach- und Überprüfbarkeit von selbstgesteuertem Lernen wäre unter diesen Bedingungen schwer.

SDL brauche nach Lehrkraft C‘s Meinung mehr Zeit, würde aber mehr Erfolg bringen. Sie plädiert für Mischung aus SDL und TDL, da Mensch nicht auf eine Weise alles lernen würde, denn es komme auf die Lernsituation und den Altersgrad an. Es würde mit steigendem Alter zunehmen. In Realität wäre es aber umgekehrt, da SuS in Kindergarten und Grundschule selbstständiger arbeiten würden als auf einem Gymnasium, was paradox sei. SDL müsste SuS erstmal kontinuierlich beigebracht werden. Ein Problem für die Umsetzung von SDL sieht Lehrkraft C z.B. bei ihrer eigenen Chemieklasse, da diese nicht gut dafür vorbereitet sei und SDL bei ihnen schwierig ist. Die Lehrkraft plädiert für stufenweise Erlernung der notwendigen Kompetenzen von SDL.

SDL sei in Lehrerausbildung stark gewünscht, aber im Schulalltag dann nicht mehr. Lehrkraft C findet, dass es Zeit werde, dass SDL mehr wird. SuS brauchen Hilfsmittel und Knowhow, um selbstgesteuert lernen zu können. Grundlegende Strategien und Lösungsstrategien zum Bewältigen von Problemen müssten von SuS erlernt werden. Wichtig wäre, dass sich die Lehrkraft dann immer weiter zurückziehe, um dann zu einer Beraterin zu werden.

Das Fach MINT sei komplett frei und ohne Lehrplan, weshalb nur wenig Lehrkräfte es unterrichten wollen und abgeschreckt seien, da das Fach komplett ohne Vorgaben zu unterrichten ist. Es sei nur auf Thema Bio/Chemie begrenzt und experimentell angelegt. Lehrkraft musste extra Ordner mit Vorschlägen anlegen, da Lehrkräfte es nicht mochten, dass es keine Vorgaben gebe. Lehrkraft fragt sich, warum dies nötig sein muss.

ITG werden ein Halbjahr eine Stunde extra unterrichtet, soll allerdings gekürzt werden und stattdessen in MINT umgewandelt werden, wodurch SDL Stunden sogar institutionell reduziert werden würden.

Appendix J. Data Collection. Interview with Teacher C

Themes	Teacher's statement
Institutional framework 1. Curriculum	- Lehrplan erzeuge Zeitdruck, da die vom Lehrplan vorgegebene Stunden für ein Themenfeld zu knapp bemessen seien - Zeitplan des Lehrplans würde mit einer ausgezeichnet leistungsstarken Klasse vielleicht funktionieren, im Normalfall allerdings nicht → Lehrkräfte müssen unter Zeitdruck die vorgegebenen Themen durchbringen, um den Zielen des Lehrplans gerecht zu werden - Lernziele des Lehrplans seien sehr offen → Lehrkraft A's Meinung nach sogar vielleicht zu offen
2. Length of lessons	
3. Evaluation	- Lehrkraft hätte gern eine Kontrolle im Unterricht, da Kursarbeiten aufgrund des institutionellen Rahmens geschrieben werden müssen - Unterricht müsste deshalb aufgrund des Zeitdrucks manchmal „einfach funktional" sein
Learners	- Lehrkraft A plädiert für eine Mischung aus TDL und SDL, da Schülerinnen und Schüler nicht gelangweilt werden wollen

Appendix K. Data Analysis. Interview with Teacher A.

Themes	Teacher‘s statement
Institutional framework 1. Curriculum 2. Length of lessons 3. Evaluation	- niemand würde Lehrplan als „militärischen Drill“ ansehen → Handlungsspielräume vorhanden - würde es begrüßen, wenn Lehrplan mehr Zeit geben würde, da Stunden ausfallen können und es daher besser wäre, wenn Lehrplan nicht so dicht gestrickt wäre → Zeitdruck führe dazu, dass man recht strikt unterrichten müsse → Zeitdruck mache es schwierig, an einem Projekt teilzunehmen, das sehr selbstgesteuert wäre, da dadurch andere Sachen auf der Strecke bleiben würden - Unterrichtet weiterhin Themen, die die Lehrkraft als sehr wichtig empfindet, die aber nicht mehr im Lehrplan stehen
Learners	- Gruppenarbeiten in selbstgesteuerten Phasen könnte zu Trittbrettfahren von Lernenden führen - TDL wäre effizienter und SDL langsamer - Es sei schwierig zu sehen, wo Hürden für Schülerinnen und Schüler liegen, da Klassen heterogen wären - Findet es nicht gut, wenn klassische Lernmethoden, die schon sehr lange benutzt werden, pauschal kritisiert werden - SDL sei sehr anstrengend für Schülerinnen und Schüler → sie müssten auch mal durchschnaufen können → begrüße, dass es bezüglich des Schwerpunktes von TDL und SDL fächermäßig Unterschiede gebe - SuS wären auch mal froh, wenn Aktivitätsniveau nicht immer so hoch ist - Berichtet von Erfahrung einer Schülerin, dass selbstgesteuertes Lernen auf Waldorfschule zwar von einige Schülerinnen und Schüler gut wäre, andere es jedoch ausnutzen würden - Bekam schon gutes Feedback für klassische (im Sinne von lehrergesteuerten) Stunden, bei denen Schülerinnen und Schüler sagten, sie hätten den Stoff wirklich kapiert

Appendix L. Data Analysis. Interview with Teacher B.

Themes	Teacher‘s statement
Institutional framework 1. Curriculum	- NaWi-Lehrplan siehe SDL vor und räume dafür Freiräume ein → dies werde zum Beispiel in Form einer Projektarbeit vorgeschrieben - sei im Vergleich zu früher sehr grob gehalten, offen und Lehrkraft wäre nicht so wie früher an Stunden gebunden - solle theoretisch nicht gesamte Stunden ausfüllen, sodass Lehrkraft Freiräume blieben und durch viele Themen, die nicht gemacht werden müssen, die Lehrkraft den Unterrichtsstoff variieren kann → in der Praxis sei dies jedoch durch Stundenausfälle, schwierigeres Schülerklientel als früher und einer hohen Anzahl an Schülerinnen und Schülern schwierig, da die Zeit sehr knapp wäre - NaWi erlaube exemplarisches Arbeiten, was förderlich für SDL sei - MINT hat keinen Lehrplan, weshalb Lehrkraft sich nur an die experimentelle Orientierung von Biologie und Chemie halten müsse
2. Length of lessons	- 45-minütige Unterrichtsstunde sei zu kurz für die erfolgreiche Umsetzung von SDL → Institutioneller Rahmen mache es durch sechsmal am Tag wechselnde Fächer schwierig, SDL erfolgreich umzusetzen, da sechs selbstständige Projekte gleichzeitig am Tag laufen würden → in einer 45-minütigen selbstgesteuerten Stunde würde fachlich nur sehr wenig bei SuS hängen bleiben
3. Evaluation	- Nach- und Überprüfbarkeit von selbstgesteuertem Lernen wäre unter momentanen institutionellen Bedingungen in Deutschland schwierig
Learners	- SDL könne die Motivation von einigen SuS erhöhen, dies müsste jedoch an den Unterrichtsgegenstand gekoppelt sein. → nicht jeder Unterrichtsgegenstand sei für SDL geeignet - SDL brauche mehr Zeit, aber bringe mehr Erfolg - Plädiert für Mischung aus SDL und TDL, da Mensch nicht auf eine Weise alles lernen würde - Erfolg von SDL hänge von Lernsituation und Altersgrad an → Würde mit steigendem Alter zunehmen → in Realität wäre es aber umgekehrt, da SuS in Kindergarten und Grundschule selbstständiger arbeiten würden als auf Gymnasium, was paradox sei

	→ SDL müsste SuS kontinuierlich beigebracht werden - Problem, dass Chemieklasse der Lehrkraft nicht gut für SDL vorbereitet ist und deshalb schwierig umzusetzen wäre - Plädiert für stufenweise Erlernung der notwendigen Kompetenzen von SDL - Grundlegende Strategien und Lösungsstrategien zum Bewältigen von Problemen müssten von SuS erlernt werden

Appendix M. Data Analysis. Interview with Teacher C.

Eidesstattliche Erklärung

Hiermit versichere ich, dass ich die Bachelorarbeit selbstständig verfasst und keine anderen als die angegeben Quellen und Hilfsmittel benutzt habe, alle Ausführungen, die anderen Schriften wörtlich oder sinngemäß entnommen wurden, kenntlich gemacht und die Arbeit in gleicher oder ähnlicher Fassung noch nicht Bestandteil einer Studien- oder Prüfungsleistung war.

Kaiserslautern, den 07.12.2019

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