Studies on the effects of structure in the context of autonomy-supportive or controlling teacher behavior on students' intrinsic motivation

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ABSTRACT

Trips to extracurricular settings can foster exploration and may promote self-determined learning. Students' motivation is an essential characteristic of self-determined and successful learning processes in extracurricular settings. The Self-Determination Theory argues that the quality of students' motivation is inter alia dependent on the fulfillment of the basic need for competence. Extracurricular settings are potentially unstructured and may therefore frustrate students' perception of competence. Teachers tend to show restrictive behavior and use teacher-led and task-oriented instructions in non-formal settings. These findings were used to design a typical situation in an extracurricular setting. We hypothesized that the provision of supplementary structure improves students' quality of motivation by supporting their need for competence. In our 1st study, 198 students ($M_{age} = 11.96$, $SD_{age} = 1.11$, $R_{age} = 4.97$) visited an exhibition dealing with locomotor systems. Two degrees of structure were implemented: basic and supplementary structure. Students' motivation was assessed at the end of the visit. The results of study 1 did not show the assumed positive effect of supplementary structure on students' motivation. By closely analyzing our study design, we suspected that the implemented teacher behavior in extracurricular settings might not have been appropriate. Consequently, we conducted a 2nd study ($N = 189$; $M_{age} = 12.45$, $SD_{age} = 1.09$, $R_{age} = 4.69$) that again examined the effect of two degrees of structure on students' quality of motivation. This time, we implemented autonomy-supportive teacher behaviors. Otherwise, the study was conducted identically. In study 2, we found beneficial effects of supplementary structure on students' motivation. Comparing both studies, additional structure showed only positive effects on students' motivation, when teachers acted autonomy-supportively.

1. Introduction

Because extracurricular settings such as museums often facilitate authentic encounters (Griffin, 1998), freedom of choice (Bamberger & Tal, 2006) and possibilities for self-determined learning (Wilde & Urhahne, 2008), they may provide a valuable opportunity to contribute to students' intrinsic motivation during their learning processes. At the same time, learners in extracurricular settings may experience disorientation (Griffin & Symington, 1997; Hofstein & Rosenfeld, 1996; Rennie & McClafferty, 1995) in these exceedingly multifaceted learning settings (Hidi & Anderson, 1992; Rennie, 1994), potentially resulting in missed learning opportunities (Falk & Balling, 1982; Gottfried, 1980; Griffin & Symington, 1997). To avoid feelings of disorientation and excessive demand as well as time-delayed engagement with the exhibits in extracurricular settings, orientation can be facilitated through structure. The provision of structure plays a key role in terms of promoting students' perception of competence (Basten, Meyer-Ahrens, Fries, & Wilde, 2014; Grolnick & Ryan, 1989) and might have an influence on students' motivation (Connell & Wellborn, 1991; Deci & Ryan, 2002; Prokop, Tuncer, & Kvasničák, 2007; Ryan & Deci, 2017; Skinner, Furrer, Marchand, & Kindermann, 2008). The basic need for competence and its effects on motivation are anchored in Self-Determination Theory (SDT; Deci & Ryan, 2002; Ryan & Deci, 2017). Provisions of structure that support the perception of competence can be derived from the SDT (Deci & Ryan, 2002; White, 1959). Structure in the sense of the SDT supports students in their interactions with their surroundings. Thereby, it may facilitate successful and effective interactions with learning materials in unfamiliar learning environments. In extracurricular settings, this may help students achieve a balance between the requirements of the tasks and their individual abilities (Deci & Ryan, 1993).

To date, there are no theoretical approaches that are tailored to the specific requirements of extracurricular settings for school class visits (Eshach, 2007). Falk and Storksdieck (2005) consider it critical to apply models of formal learning to learning in extracurricular settings. Falk and Dierking's (2000) Contextual Model of Learning (CMoL) is a model

for museum learning. Three contexts are considered important for museum learning: the personal, the physical and the socio-cultural context (Falk & Dierking, 2000). The CMoLs holistic view on learning represents a construction of knowledge. This learning is dependent on the interaction of the three contexts with one another. Still, some relevant aspects for school learning in extracurricular settings are missing (Eshach, 2007). Eshach (2007) argues that the model insufficiently refers to the required balance of cognitive and affective factors in non-formal settings. Augmenting the contexts of the CMoL with the SDT might help complement the CMoL regarding affective aspects and emphasize certain instructional aspects more explicitly. The SDT in particular emphasizes the prerequisites for favorable qualities of motivation (Deci & Ryan, 1985, 2000, 2002). Moreover, it specifies the operationalization of structure in terms of the basic need for competence and may therefore present a valuable opportunity to contribute to successful learning processes in non-formal learning settings in the CMoLs physical context. Accordingly, the provision of structure might prevent students from losing their focus on learning opportunities, avoid disorientation and helplessness and reduce perceived novelty. Consequently, structure might improve the quality of a typical school class visit. Based on the SDT and the CMoL, we conducted a study investigating two degrees of structure, basic and supplementary, for a school class visit to an exhibition at an extracurricular setting. The provision of structure affected structural and orientation aides as well as the design of the exhibition. We operationalized supplementary structure as communicating clear expectations towards students, offering guidance systems, advance organizers as well as orientation aides and a strong linkage of students' tasks and overall design. Basic structure did not contain these elements.

Our aim was to investigate these types of structure in the context of a typical school class visit to an extracurricular setting. The teacher behavior was therefore characterized by task-orientation, directives and direct instructions in the first study (Griffin, 1994; Griffin & Symington, 1997). In the second study, we took the teacher behavior into consideration. The implemented teacher behavior in study 1 is assumed to be controlling and might have an impact on the quality of motivation to such an extent that the variation of structure might be confounded. Therefore, we investigated the described two types of structure again in the context of autonomy-supportive teacher behavior. This behavior was characterized by non-controlling language and the acknowledgment of the students' perspective.

2. Theory

2.1. Non-formal learning settings

The CMoL by Falk and Dierking (2000) is a holistic theory that explains and frames learning in museums. According to Falk and Dierking (2000), the term museum learning describes learning in various extracurricular settings, such as zoos, aquariums, botanic gardens, interactive exhibitions and – of course – museums. Yet, it does not especially focus on museum learning for school class visits. In general, two types of learning environments may be distinguished: formal and informal (Eshach, 2007). The most common formal setting is school, which is teacher-led and highly structured. Informal settings, on the other hand, are unstructured, learner-led and can potentially occur in everyday situations. According to Dierking (1991) and Eshach (2007), a sharp distinction between formal and informal learning is inappropriate. Museum learning appears in an extracurricular setting that refers to learning outside the classroom, yet is at the same time pre-arranged and structured. Often, there are working materials or guides that can be ascribed to situations of formal learning. Eshach (2007) describes these situations as non-formal. Learning in non-formal settings is not easy to describe, since working in these settings may be more or less student-led and more or less structured depending on the teacher, guide and visited institution. Taking this into account, they

may still offer motivation for learning that is intrinsic to the learner (Eshach, 2007). For school class visits to extracurricular settings, students' learning is quite similar to formal learning. Teachers tend to transfer priorities such as cognitive achievement, teaching goals and teacher-led instructions from formal to non-formal settings (Griffin, 1994; Griffin & Symington, 1997; Lewalter & Geyer, 2009). In reference to Eshach (2007), the CMoL does not emphasize all aspects of non-formal learning adequately, especially for school class visits. On one hand, the goals and structure of school trips need to be accentuated. On the other hand, affective domains need to be emphasized more systematically (Eshach, 2007; Randler, Ilg, & Kern, 2005). Both issues might be addressed by complementing the CMoL with the SDT. The SDT has been successfully applied to several domains, including education (Deci & Ryan, 2008). According to the SDT, goals and structure are intertwined with the perception of competence and intrinsic motivation. In the following paragraph, the SDT is linked with the CMoL.

2.2. The contextual model of learning and the self-determination theory in the context of non-formal learning settings

The CMoL is a framework for learning in extracurricular settings. The CMoL takes a holistic view of learning in museums to take the complexity of museum learning into account. It refers to situated museum learning in free-choice-settings (Falk & Dierking, 2000; Falk & Storksdieck, 2005). Learning in these settings is considered a dialogue between the individual and the environment. According to the CMoL, working and learning in these environments is dependent on three contexts: the personal, the socio-cultural and the physical (Falk & Storksdieck, 2005). The personal context deals with motivation, interests and previous knowledge of individual visitors as well as choice and control when interacting with the exhibits. The socio-cultural context includes cultural values and social relationships (Falk & Storksdieck, 2005). It focuses on interactions between the visitors as well as interactions between visitors and museum staff, e.g. museum guides (Falk & Storksdieck, 2005). The physical context addresses characteristics of the setting and the design of an exhibition (Falk & Storksdieck, 2005). It describes the availability of advance organizers, orientation aides and the overall design of the settings (Falk & Storksdieck, 2005). Our studies focus on the physical and the personal context.

According to Eshach (2007), the CMoL does not emphasize all aspects of non-formal learning adequately, especially for school class visits. The SDT can supplement the CMoL as it takes affective factors into special consideration. The three contexts can be attributed to the basic needs anchored in the SDT, thereby enabling the operationalization of the contexts. In this way, non-formal settings may be studied. The personal context can be attributed to the basic need for autonomy, the socio-cultural context to the basic need for relatedness and the physical context to the basic need for competence (Basten et al., 2014). The contexts as they are perceived by the visitors may then be empirically tangible.

In the SDT, Deci and Ryan (2002) state that the satisfaction of the mentioned basic psychological needs plays an essential role in fostering positive qualities of motivation (Deci & Ryan, 2002). Since learning in non-formal settings may be unstructured, the students might be overwhelmed by the possibilities of the learning environment. They might feel disoriented and may feel that they are unable to meet the perceived expectations (Falk & Balling, 1982; Gottfried, 1980; Griffin & Symington, 1997; Hofstein & Rosenfeld, 1996; Rennie & McClafferty, 1995). As a result, the fulfillment of the basic need for competence might be impaired. Consequently, the need for competence should be focused in the design of appropriate learning settings. The need for competence is satisfied when individuals feel successful and effective in their interaction with their environment (Deci & Ryan, 2002). Individuals have the innate tendency to create new and challenging experiences to enhance their abilities, discover and learn (Ryan & Deci, 2000). Non-formal learning settings enable students to discover,