Learning and Instruction 58 (2018) 12–21

Contents lists available at ScienceDirect

Learning and Instruction

journal homepage: www.elsevier.com/locate/learninstruc

Is technology-enhanced feedback encouraging for all in Finnish basic education? A person-centered approach

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ABSTRACT

In Finnish basic education, the majority of teachers give technology-enhanced feedback about learning and behaviour on a daily basis by clicking predefined options in an online platform. In this study, we explored 211003 feedback actions given by 704 teachers to 7811 pupils and their parents using latent profile analysis. Information on individual support needs was used to evaluate whether all pupils are equally encouraged by technology-enhanced feedback. We identified six subgroups for girls and five for boys. Highly encouraging feedback was given mostly to pupils who were rarely absent and who more seldom had special education needs. Negative feedback about behaviour problems was given mostly to boys and the majority of pupils were encouraged only weakly. On average, pupils received feedback according to three different profiles in a single teaching group. We concluded that technology-enhanced feedback in its current form is not equally encouraging for all.

1. Introduction

Receiving online feedback from the teacher via a computer or smartphone has become a daily practice in several countries. Both pupils and parents find these platforms useful but also frustrating (Palts & Kalmus, 2015). In Finland, the majority of basic education schools use platforms as a convenient method to provide instant feedback related to learning and behaviour during lessons just by clicking predefined options. A recent study by Oinas et al. (2017) showed that in this context, technology-enhanced feedback was delivered unequally to pupils. This study aims to deepen the understanding of current practices of technology-enhanced feedback by looking at different types of feedback profiles from individual pupils' perspective. Due to shortage of earlier research, it is important to study how new technologies are currently used for supporting learning between different learner subgroups but also to detect if technology-enhanced feedback practices are in line with inclusive *schools for all* policies implemented at least in Europe and USA (ESSA, 2015; Taub, McCord, & Ryndak, 2017; Telhaug, Mediås, & Aasen, 2006). Both theory and curriculum emphasise that one of the most important goals of teaching pupils with special education needs is to prevent future problems by offering encouraging feedback (Hughes, 2010; NBE, 2014; Taub et al., 2017). Behaviour problems may be the reason for special education needs, and there are strong reasons to assume that pupils with special needs receive more negative feedback related to behaviour problems. If this is the case, encouraging feedback should be provided to balance the situation (Moore Partin, Robertson, Maggin, Oliver, & Wehby, 2010). To enhance the motivation and learning of a pupil, feedback should be emotionally encouraging and targeted to the learning process rather than the learner as a person (Dweck & Master, 2009; Hughes, 2010; Rowe, 2010; Tennant et al., 2015), which is usually the situation when assessing behaviour.

There are several studies related to the effects of technology-enhanced feedback on learning outcomes (eg, Tanes, Arnold, King, & Remnet, 2011) and interest toward learning analytics is growing (Tempelaar, Rienties, & Giesbers, 2015), However, there is a gap in theory about technology-enhanced feedback related to observed learning and behaviour during the lessons (Palts & Kalmus, 2015), especially when different learners are considered.

The data of this study consist of 211 003 separate feedback notes analysed partly in our previous study (Oinas et al., 2017). Feedback notes were delivered by 704 teachers to 7811 pupils via a technology-enhanced platform in the school year 2014–2015. Previous analyses made both by parametric and non-parametric methods showed that feedback is distributed unevenly to girls and boys regarding the amount and the content of feedback, indicating the possibility of differentiated profiles. Now we have also included information of individual support

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https://doi.org/10.1016/j.learninstruc.2018.05.002
Received 28 September 2017; Received in revised form 28 April 2018; Accepted 5 May 2018

needs and absences to analyses. A latent class analysis by Reinke, Herman, Petras, and Ialongo (2008) showed that academic difficulties were the reason for special education needs for girls, but for boys, behaviour problems also explained the placement in a subgroup of special education needs. Therefore, we expect the feedback, which is in our focus, to be different for girls and boys. Gendered analyses are also necessary due to uneven distribution of girls and boys in the group of children with special education needs (Statistics Finland, 2016) and, gender differences in learning outcomes and attitudes (OECD, 2018). We aim to identify subgroups of pupils with different feedback profiles in the context of the Finnish three-tier support model (Vainikainen, 2014), which is implemented to prevent problems by providing individual support whenever there is a need. We use latent profile analysis (LPA) to reveal student-level differences instead of comparing means (see Shenke, Ruzek, Lam, Karabenick, & Eccles, 2018). The target is to assess whether pupils with or without support needs are treated equally according to technology-enhanced feedback based on the concept of *school for all*. Theoretically this paper focuses on the role of encouraging feedback and emotional support in enhancing learning highlighted both by pupils and theory (e.g. Ferguson, 2011; Hattie & Timperley, 2007; Rowe, Fitness & Wood, 2014; Tennant et al., 2015).

1.1. Feedback and technology

New online technologies have been adopted rapidly both in general and special education. According to a recent meta-analysis, online tools can support learning of individuals with special needs (Cumming & Rodriquez, 2017), and technology-enhanced feedback can promote learning (Yuan & Kim, 2015). In this study, feedback is defined from the formative assessment perspective, where the purpose of the feedback is to provide information on how to work towards a desired goal from the current level of performance or behaviour (Hughes, 2010). Studies about technology-enhanced feedback typically focus on the presence, timing or content of feedback (Kefalidou, 2017; Yuan & Kim, 2015). This study focuses on the content, providing new knowledge about the given technology-enhanced feedback related to learning and behaviour during the lessons.

A recent Estonian study describes the benefits and disadvantages of technology-enhanced teacher feedback (Palts & Kalmus, 2015) by showing that technology enhances home-school collaboration although parents perceived that messaging may reduce pupils' responsibility to take care of their own duties. Similar critique has been published in New York Times (Hoffman, 2008) indicating the need for evaluating the technology-enhanced feedback practices.

Studies about feedback often describe interventions where feedback is provided to improve learning results (e.g. Hattie & Timperley, 2007; Kluger & DeNisi, 1996) or behaviour (Stanton-Chapman, Walker, Voorhees, & Snell, 2016). According to Hattie and Timperley (2007), feedback can be positive or negative, and both may enhance learning outcomes and motivation (see also Ryan & Deci, 2009). However, both types of feedback may also be harmful if feedback targets the learner as a person instead of focusing on the learning process (Dweck & Master, 2009; Rowe, Fitness & Wood, 2014). Feedback should be designed carefully, as feedback based on social comparison with peers can be perceived either positively or negatively and thus have an influence on whether pupils adopt a learning-approach or learning-avoidance orientation (Pekrun, Cusack, Murayma, Elliot, & Thomas, 2014). On the other hand, learning may be fostered by warning of possible errors (Acuna, Garcia-Rodiccio, & Sanchez, 2010; Loibl & Rummel, 2014), although feedback describing mistakes may promote learning avoidance (Shin, Lee, & Seo, 2017). In fact, Kluger and DeNisi (1996) found, based on 3000 studies, that more than one out of three feedback interventions influenced learning outcomes negatively.

University students appreciate both positive and negative feedback if they perceive it useful for improving their studies (Rowe et al., 2014). In contrast, students who easily feel that they have failed or who feel guilt over undone work consider feedback as irrelevant as they fear receiving negative feedback (Rowe et al., 2014). Previous experiences of success and failure shape the way the given feedback is interpreted (Kluger & DeNisi, 1996). Hughes (2010) warned that pupils at risk of academic failure usually avoid corrective feedback as they perceive it as a negative assessment toward themselves. The variation in feedback practices may be explained by different behaviour of teachers, as there are still teachers who perceive technology as a threat (Gao, Yan, Wei, Liang, & Mo, 2017). Furthermore, teachers' perceptions of pupils' capability to learn may have impact on evaluation (Mullola, 2012).

1.2. Feedback as encouragement in school for all

Inclusion has been the focus of special education since the 1980s, and the aspiration of inclusion was part of the UNESCO Salamanca statement on special education in 1994 (UNESCO, 1994). According to a broad definition of inclusive education, every child is a unique individual and has the right to be accepted to school just as he or she is (Hotulainen & Takala, 2014). The idea of *school for all* is not, however, the reality in Finland. Despite inclusion, over four percent of Finnish pupils in basic education are still transferred into segregated classrooms for example based on inappropriate behaviour or disability (Saloviita & Schaffus, 2016).

The focus of inclusion is to provide early support to prevent future problems, for example, school dropout (Maggin, Wehby, Warner & Brooks, 2016; Taub et al., 2017). Hughes (2010) writes that the goal of feedback for pupils with special needs is to reduce the at-risk status of these pupils. She continues that more research is needed to evaluate whether pupils at risk benefit from teacher praise as encouragement (Hughes, 2010).

Emotional or behavioural problems occur in most adolescents, but with appropriate support, these problems can be solved (Maggin, Wehby, Farmer, & Brooks, 2016). Teachers' verbal encouragement that illustrates a desired behaviour has a connection to the positive behaviour of first graders (Spivak & Farran, 2012). Emotional support as a form of feedback by the teacher is related to better achievements, school adjustment and fewer problems in pupils (Tennant et al., 2015). In their study, Tennant et al. (2015) recognised several gender differences in how pupils perceived and took advantage of emotionally supportive feedback from their teachers. A recent study also showed that teachers' unfair classroom practices are connected to variation of emotional support provided by teachers as perceived by pupils (Shenke et al., 2018). Supportive feedback increases students' perceived motivation and decreases anxiety and stress (Rowe, 2010). Providing positive feedback through technology may be essential if one has a tendency to be anxious (Hinton, Fischer, & Glennon, 2012). However, Alcott (2017) argues that teachers put more effort into enhancing educational progress by providing encouragement for high performing students, although it would be the most beneficial for averagely performing students.

Encouraging feedback goes hand in hand with creating a positive learning environment, as it also increases school adjustment, well-being (Reddy, Rhode & Mullhal, 2003) and engagement (Klem & Connel, 2004). A large-scale study showed that support from the teacher has an impact on the development of better self-esteem in 6th-8th graders (Reddy, Rhode, & Mulhall, 2003). Even students at the university level need encouraging feedback to balance critique and to maintain confidence (Ferguson, 2011). However, Harris, Brown, and Harnett (2014) reported that teachers (N = 612) evaluated supportive feedback as being less important. Unfortunately, teachers may also use unprofessional methods, as for example label the pupil on the basis of personal qualities, or show frustration or hostile emotions with “problematic” pupils (Kourkoutas & Giovazolias, 2015), which jeopardises any perceived emotional support. There is a clear evidence that a pupil with support needs and behaviour problems may end up dropping out of school and even into a cycle of failure without individual encouraging