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Autonomy-supportive learning with VaKE (Values and Knowledge Education) in teacher education. Fostering empathy and cognitive complexity.

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Abstract

The aim of this study is to examine enhanced autonomy-supportive teaching with VaKE (Values and Knowledge Education) in teacher education. VaKE is a constructivist teaching and learning approach which combines values and knowledge education, providing possibilities for autonomous learning. A quasi-experiment was applied with N = 43 pre-service teachers in an Austrian university of teacher education. The standard VaKE was compared with VaKE focusing on enhanced autonomy-supportive teaching by providing option choices. Dependent variables were the capacity to take the perspective of others (empathy) and the capacity to deal adequately with multiple sources of knowledge (cognitive complexity). The results indicate that empathy and cognitive complexity can be increased when providing enhanced cognitive autonomy support with VaKE. The main conclusion is that pre-service teachers can benefit in their moral as well as knowledge-related capacities when learning according to VaKE with provided option choices.

Keywords: *VaKE; teacher education; autonomy-supportive teaching; empathy; cognitive complexity.*

1. Introduction

Educational psychologists and teachers agree that autonomy-supportive teaching contexts enhance student motivation resulting in improved performance and learning. Autonomy-supportive teaching has gained increased attention in teacher education in the last years (e.g., Meeus et al., 2008) aiming to foster pre-service teachers' professional capacities. One way to implement autonomy-supportive teaching consists in providing opportunities to make personal choices. The didactical approach V*a*KE (Values *and* Knowledge Education; Patry et al., 2013), which combines moral education through dilemma discussion (Lind, 2016) and knowledge construction through inquiry learning (Reitinger et al., 2016), promotes autonomous learning based on constructivist learning principles by offering opportunities for personal choices. The aim of the study is to examine V*a*KE with respect to its potential to foster pre-service teachers' capacities (a) to take the perspective of others (empathy), and (b) to distinguish, integrate and apply multiple pieces of knowledge (cognitive complexity). Both capacities refer to essential goals in teacher education (Tettegah & Anderson, 2007; Bullough et al., 2016).

2. Autonomy-supportive teaching with V*a*KE (Values *and* Knowledge Education)

V*a*KE is a constructivist approach aiming to promote moral judgment (Rest et al., 2000) and the acquisition of deep knowledge (Piaget, 1985). Constructivist learning contexts are characterized by support for the learner's autonomy. According to the self determination theory (Deci & Ryan, 2008), autonomy-supportive teaching promotes intrinsic motivation and leads to improved learning. An individual's sense of autonomy represents a feeling of full volition and "choicefulness" depending on one's values and interests (Deci & Ryan, 2008). Autonomy is best supported through providing the opportunity for choices. V*a*KE consists of eleven steps, each of which provides opportunities to make choices (see Tab. 1).

A V*a*KE unit starts with the introduction of a content-related moral dilemma, which is designed to trigger a moral question ("What should be done, and why?") as well as knowledge-related questions ("What do I need to know to come to a satisfying solution?"). The learners discuss about the values which they deem important in the dilemma (step 1). Subsequently they reflect upon their decision and write down their own argument (step 2). In small groups they discuss the dilemma addressing their individual moral point of view (step 3). The results of the discussions are exchanged and all open questions regarding missing knowledge are collected. Learners decide how to organize the following information search and the final learning product (e.g., poster) which will be presented later (step 4). Then they organize themselves in groups to search for the individually relevant missing knowledge using different sources of knowledge (step 5). They exchange their

acquired knowledge and discuss it so that all learners have the same level of knowledge (step 6). After that the dilemma discussions in small groups are continued. The learners integrate their individually relevant knowledge into their moral judgment (step 7). In a general discussion the results of the dilemma discussions are presented and all learners discuss their favored arguments (step 8). If there are still open questions, the steps 4 to 8 can be repeated once again (step 9). In the final synthesis the learners present the proposed problem solutions (learning product) of the whole group (step 10). Finally, in the generalization, the learners deal with similar issues they consider important to broaden the perspective (step 11).

Table 1: Standard steps in V*a*KE

(1) Introducing the dilemma: Which values are at stake?
(2) First decision: Who is in favor, who against?
(3) First arguments (dilemma discussion): Why are you in favor, why against? Do we agree with each other?
(4) Exchange experience and missing information: Exchange of arguments; what more do I need to know to be able to argue further?
(5) Looking for evidence: Get the information, using any source available!
(6) Exchange of information: Present the information! Is the information sufficient?
(7) Second arguments (dilemma discussion): Why are you in favor, why against?
(8) Synthesis of information: Present your conclusions!
(9) Repeat 4 through 8 if necessary
(10) General synthesis: Closing the sequence capitalizing on the whole process!
(11) Generalization: Discussion about other related topics

Source: Adapted from Patry et al. (2013, p. 567).

VaKE includes all different ways of autonomy support which can be provided in the class-room (Stefanou et al. 2004), namely organizational (e.g., learners decide about the organization of the information search and the learning product), procedural (e.g., learners choose the sources of knowledge), and cognitive autonomy support (e.g., learners generate their own solutions to the VaKE dilemma). Research has shown that cognitive autonomy support that allows the learners to control the initiation and regulation of their behavior in addition to providing option choices, enhances intrinsic motivation and subsequent learning most (e.g., Cordova & Lepper, 1996). Cognitive autonomy support in VaKE can be enhanced by providing option choices regarding the moral dilemma. Moral dilemmas which are meaningful to the learner evoke more empathy than less relevant ones (Skoe et al., 2002). According to Davis (1994), empathy consists of a cognitive (the ability of knowing another person's thoughts and feelings) and an affective component (the ability to imagine how another is thinking and feeling). It seems also reasonable to assume that dilemmas which are meaningful to the learner lead to intrinsic motivation and a more

intense engagement with multiple sources of knowledge resulting in improved cognitive complexity. Cognitive complexity can be enhanced through active practice in problem solving related to an actual role-taking experience and augmented by interactive changes with others (Sprinthall et al., 2000) which are key elements of a dilemma discussion in V*a*KE. Thus, the hypotheses are that V*a*KE with enhanced autonomy will support learning through providing option choices regarding the moral dilemma and hence will foster (a) empathy and (b) cognitive complexity to a greater extent compared to the standard V*a*KE.

2. Method

2.1. Participants and research design

The study was conducted in a university of teacher education in Austria with two classes (class 1: N = 20; five males; class 2: N = 23; five males; mean age: 22.8, range: 19.8 to 45.2 years). All participants gave informed consent to take part in the study. In a quasi-experiment with pretest (T1 after step 2 in V*a*KE) and posttest (T2, after the end of the V*a*KE unit) the experimental group (EG, class 1) learned according to V*a*KE providing the opportunity to choose between five content-related moral dilemmas (abortion, helping illegaly refugees, drug abuse, planting gene-manipulated corn in Africa, reproductive cloning), while the control group (CG, class 2) learned according to the prototypical V*a*KE with a pre-defined randomly selected content-related moral dilemma (reproductive cloning). All dilemmas were designed following the criteria for good V*a*KE-dilemmas according to Weinberger et al. (2008). In the EG all persons decided to discuss the abortion dilemma. The intervention in each group lasted six units of 90 minutes according to the steps of V*a*KE.

2.2. Instruments

The first instrument was the Saarbrückener Persönlichkeitsfragebogen SPF (Paulus, 2009), a paper and pencil questionnaire assessing the cognitive and affective components of *empathy* on 5-point Likert-scales. Three subscales were assessed (Perspective Taking, Empathic Concern, and Fantasy). In order to examine convergent validity, empathy was also assessed with a second instrument which was an open-ended questionnaire (OEQ). The OEQ was also used to assess the level of *cognitive complexity*. It consists of two questions: 1) What should the protagonist of the dilemma do? 2) Why should the protagonist do that? In order to check the operationalization of the independent variable (manipulation check) a single question about the participants' interest in the dilemma was asked, to be answered on a 5-point Likert-scale. The participants responded to the three questionnaires at T1 and T2.

2.3. Analysis

Following Paulus' (2012) suggestion to improve test efficiency, an aggregated empathy score built from the three subscales of the SPF was used (reliability: Cronbach's Alpha = 0.81). The differences in the SPF-scores between EG and CG were analyzed using a repeated measures ANOVA. The answers to the second question of the OEQ were content-analyzed according to Mayring (2014). The categories for analyzing empathic responses were derived from Davis' (1994) assumption that empathy includes a cognitive component (perspective taking) and an affective component (empathic concern). The unit of analysis were text segments (e.g. sentences). All text units referring to another person's view were assigned to the category Perspective Taking. All text units mentioning other-oriented emotions were assigned to the category Empathic Concern. The categories for analyzing the level of cognitive complexity were derived from Streufert et al. (1987) who posit that cognitive complexity can be assessed along the three dimensions differentiation, discrimination and integration. In the current study only differentiation and discrimination were used since the data did not allow to analyze integration. Differentiation indicated the number of text units representing different concepts expressed by the same person. Text units representing different pieces of information about one concept were assigned to the category Discrimination. Interrater-reliability (Krippendorff's alpha) was satisfying (empathy: KALPHA = 0.83, cognitive complexity: KALPHA = 0.78). Based on the assumption that the best estimate of participants' responses to the latent variable is given by the responses of the participants to a composite variable (Walkey, 1997) all subsequent analyzes of the OEQ-results were done using a unit-weighted aggregated score for empathy, built from the two empathy scores, and for cognitive complexity, built from the two cognitive complexity scores. Statistical analyzes were calculated using ANOVAs with repeated measures and *t*-tests (post-hoc tests with Bonferroni-corrected alpha level).

3. Results

3.1. Manipulation check

A repeated measures ANOVA with the dependent variable interest in the dilemma, the between subjects factor group (EG vs. CG), and the within subjects factor time (T1 vs. T2) resulted in a significant interaction effect time by group ($F(1/41) = 8.59$, $p < 0.01$, $\eta^2 = 0.19$). Subsequent analysis of this effect indicate that interest increased in the EG ($t(19) = 3.11$, $p < 0.01$, $d = 0.6$; $M_{T1} = 4.00$, $SD = 0.79$; $M_{T2} = 4.47$, $SD = 0.71$) while there was no difference found in the CG ($t(22) = -1.31$, *n.s.*, $d = -0.2$; $M_{T1} = 3.68$, $SD = 0.94$; $M_{T2} = 3.45$, $SD = 1.19$). The group main effect was significant ($F(1/41) = 6.02$, $p < 0.05$, $\eta^2 = 0.14$); the dilemma was of higher interest for the EG than for the CG. The time main effect was not significant ($F(1/41) = 1.04$, *n.s.*, $\eta^2 = 0.03$). These results indicate that indeed the EG

students were more interested in the dilemma than those of the CG, and that the interest in the EG increased.

3.2. Testing of Hypothesis 1: Empathy

In view of the natural setting it was not possible to control for all the differences between the participants in both groups. However, the results of independent samples *t*-tests with Bonferroni corrected alpha level show no significant differences between the EG and CG at T1 for the SPF-score ($t(41) = 0.32$, *n.s.*, $d = 0.1$) and for the OEQ-score for empathy ($t(41) = 1.26$, *n.s.*, $d = 0.4$). In order to determine differences between T1 and T2 a repeated measures ANOVA was calculated. Time (T1 vs. T2) and instruments (SPF vs. OEQ) were the within subject factors and group (EG vs. CG) the between subject factor. The interaction of time by instrument by group was significant with substantial variance accounted for ($F(1/41) = 14.36$, $p < 0.001$, part. $\eta^2 = 0.26$). Subsequent analyses of this effect using post-hoc *t*-tests indicate a significant gain of the SPF-score in the EG ($t(19) = -2.48$, $p < 0.05$, $d = 0.6$) from $M_{T1} = 3.69$ ($SD = 0.44$) to $M_{T2} = 3.98$ ($SD = 0.56$) and a significant gain of the OEQ-score ($t(19) = -4.40$, $p < 0.001$, $d = 1.2$) from $M_{T1} = 3.15$ ($SD = 1.34$) to $M_{T2} = 5.30$ ($SD = 2.17$), while no significant gain was found in the CG for the SPF-score ($t(22) = -0.61$, *n.s.*, $d = 0.1$; $M_{T1} = 3.64$, $SD = 0.49$; $M_{T2} = 3.69$, $SD = 0.55$,) and the OEQ-score respectively ($t(22) = 0.91$, *n.s.*, $d = -0.2$; $M_{T1} = 2.65$, $SD = 1.23$; $M_{T2} = 2.35$, $SD = 1.64$). All other interactions and main effects were found to be significant but the effects are already accounted for by the three-way interaction. The results support hypothesis 1.

3.3. Testing of Hypothesis 2: Cognitive Complexity

The *t*-test for independent samples shows a marginally significant difference in the cognitive complexity score between EG and CG at T1, with a slight advantage for the EG ($t(41) = 2.02$, $p = 0.054$, $d = 0.6$; $M_{EG} = 3.75$, $SD = 1.77$; $M_{CG} = 2.86$, $SD = 0.86$). A repeated measures ANOVA was performed to examine changes in the cognitive complexity score between the two groups. The dependent variable was the cognitive complexity score. Time (T1 vs. T2) was the within subject factor and group (EG vs. CG) the between subject factor. The results show a significant interaction effect time by group ($F(1/41) = 10.27$, $p < 0.01$, part. $\eta^2 = 0.20$). Subsequent analysis of this effect using post-hoc *t*-tests show a significant increase of the cognitive complexity score for the EG ($t(19) = -4.98$, $p < 0{,}001$, $d = 1.23$) from $M_{T1} = 3.75$ ($SD = 1.77$) to $M_{T2} = 6.47$ ($SD = 2.59$), while in the CG no significant increase was found ($t(22) = -1.88$; *n.s.*, $d = 0.45$; $M_{T1} = 2.87$, $SD = 0.86$; $M_{T2} = 3.54$, $SD = 1.90$). The main effect time was found to be significant ($F(1/41) = 28.36$, $p < 0.001$, part. $\eta^2 = 0.40$) indicating that the cognitive complexity increased summarized across

both groups. The main effect group was significant ($F(1/41) = 16.29$, $p < 0.001$, part. $\eta^2 = 0.28$) revealing that the groups differed summarized across both measuring times. The results support hypothesis 2.

3. Discussion

Enhanced cognitive autonomy support through providing the opportunity to choose a moral dilemma increases the effectivity of V*a*KE: Pre-service teachers benefit more in their ability to take the perspective of others and to process complex knowledge compared to the prototypical V*a*KE. This positive result is underlined by high effect sizes indicating the practical significance of the intervention's effectivity. Additionally, for empathy the validity of the results are emphasized by using two instruments. The study has shown that it is of importance when teaching with V*a*KE to consider the learners' goals, values and interests with respect to the moral dilemma. Since a moral dilemma is the starting point for the learning process, it is crucial that it evokes positive emotions, such as curiosity and interest, and avoids negative emotions, such as fear or boredom which hinders effective learning. The results of this study are consistent with findings of other studies in the context of self-determination theory emphasizing the significant role of autonomy for learning and performance. There are several limitations of this study due to its quasi-experimental design (e.g., small sample size, possible selection bias, possible experimenter expectancy effect) and its organizational restrictions (e.g. different moral dilemma). An important implication for teacher education is to not only use V*a*KE as a rigid method but to adapt it to the particularities of the learners by providing more opportunities of choices. This can be done, for example, by allowing the learners to grapple with their own moral dilemmas (e.g., Weinberger et al., 2016).

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