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Critical thinking about socio-political topics
among students at Vocational Education and
Training level 2

*Metacognition and empathy as facilitators to
stimulate critical thinking*

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Abstract

This study will gain insight into the critical thinking process of students at VET level 2 and whether stimulating empathy and metacognition stimulate the critical thinking process. It is assumed that critical thinking consists of two components: a disposition and an ability. In the first component the attitude of a critical thinker is reflected and the second component consists of the required critical thinking skills. Interviews based on cases about socio-political topics were held with 35 participants at VET level 2. Cases were manipulated by stimulating empathy and metacognition in order to test whether these factors stimulated the critical thinking process. The results were analyzed qualitatively and quantitatively. The observed critical thinking skills differed between participants, which shows a heterogeneous population at VET level 2. Furthermore, no significant differences in the use of critical thinking skills were found between manipulated and not manipulated conditions. In conclusion, stimulating empathy leads to a disposition to think critically but not automatically to more use of critical thinking skills. Personalized help structures should be provided in order to stimulate the critical thinking process of students at VET level 2.

Keywords: critical thinking, 21st century skills, metacognition, empathy, Vocational education, students.

Introduction

"In general, the things I've heard... Is that there're more refugees in here for the money, than real refugees. So I'd send them all back." Is this critical thinking? Where did he hear this? Is this information true? Is this a logical consideration? Is this based on different perspectives? Should we keep these questions in mind when we are forming our judgments? According to researchers and the Dutch Ministry of Education, Culture and Science: We should. Critical thinking is marked important in our rapidly changing society. Critical reflection seems to be indispensable in education, employment and in being an independent individual living in a society in which people have different views (e.g. Bussemaker & Dekker, 2015; Rotherham & Willingham, 2010; Lai, 2011).

According to the Greek philosopher Aristotle, people's thoughts and ideas are shaped by everything they observe in their environment. Due to the innate sense these observations are later placed in different classes. Aristotle calls the human being: *"an animal gifted with reason and speech"*. Hence it can be concluded that the human being is created for critical thinking. According to Cassel and Congleton (1993) there has been attention to critical thinking since Socrates started philosophising about it four centuries before Christ. He stated: *"I cannot teach you anything, I can just motivate people to think"*. Therefore, Critical thinking can be seen as a general goal of education throughout history.

However, not all scientists dealing with critical thinking see this topic as a natural and obvious activity. Shermer (2002) defines humans as: "*Pattern oriented storytelling animals.*" This means that the things we find most correct are simple and familiar patterns or stories. People are often likely to believe stories as soon as it feels good. Moreover they are always searching for patterns with regularities (Popper, 1979). Education theorist Perkins (1983) describes this as an "epistemology of throbbing data". He says that students tend to assume that a proposition is true, if it appears to be correct or sounds good or real. Students do not often see it as necessary to revise or criticize a statement that sounds good. It is considered sufficient when it feels good, so thinking critically is not necessary (Perkins, Allen, & Hafner, 1983).

When analysing a quote from Bacon (1974, originally 1605) it turns out that he believes humans do not naturally think critically: "*The mind of man is far from the nature of a clear and equal glass, wherein the beams of things should reflect according to their true incidence: nay, it is rather like an enchanted glass, full of superstition and imposture, if it be not delivered and reduced*". So, it can be concluded that he believes that people are naturally prone to self-deception, distortion and error. People get their ideas from their environment. The inclinations of people and the way they act can be referred to as cognitive inclinations and blind spots. Humans are naturally inclined to stick to their own beliefs. That means that we are not inclined to seek evidence to change our first conviction. If we look for evidence, there will be sought for evidence that supports the conviction. When evidence is found that negates the conviction, it often will be ignored. Also, when evidence is assessed to be good or bad, there is focus on the question whether it supports our conviction or not.

In addition, according to the evolution theory, the human-being is not created to think critically. Humans should just think logically enough to survive. Van Gelder (2005) illustrates this with the example that walking is a natural activity for human-beings. There might be little training in advance, but usually toddlers start to walk at a certain point and improve this skill by themselves. Originally, walking is necessary to survive. Dancing however is an example of an activity which is not natural for human-beings. Good dancers have to train for years to become a good dancer. The process of critical thinking is the same, people are natural thinkers and they just think enough to survive.

According to researchers training is required to become a critical thinker (e.g. Kuhn, 1999; van Gelder, 2005). In addition, people have to be aware of their cognitive inclinations and blind spots, in order to ignore them or to compensate their influence. A critical thinker does not ignore evidence that negates the conviction and is willing to change the first conviction when there is much evidence that proves the first conviction is not right (Douglas, 2000). Finally, a critical thinker does not cling to the expectation that everything has a certain regularity. When people do not spontaneously explore whether

there really is a regularity or whether the right sounding story is really true, problems can arise (Popper, 1979; Torringa, 2011).

Critical thinking can be considered one of the so called 21st century skills. These skills can be divided into four clusters: digital skills, thinking skills, interpersonal skills and intrapersonal skills (Christoffels & Baay, 2016). These skills are not new, but new and different abilities are needed due to the changing society (Rotherham & Willingham, 2010). As a result of this there is increased attention to the importance of these skills, and so too for critical thinking. It is marked important to think critically and it is now seen as one of the learning and innovation skills necessary to prepare students for further education and employment (Lai, 2011). Critical thinking can be seen as a necessity for survival and participation in contemporary society (Paul, 1993; Christoffels & Baay, 2016). This means that a focus on 'how' people think, instead of 'what' they should think is needed.

Previously, critical thinking was considered to be a skill that had to be mainly obtained by more highly educated people. Today, critical thinking is considered important at all levels of education. Practical professions are becoming more difficult and routine work is less common. In these professions critical thinking is important for making good decisions (Lai, 2011). This is one of the reasons why the ministry of Education, Culture and Science wants more attention for critical thinking in Vocational Education and Training program (VET, in Dutch: *MBO*), which educates students for these practical professions. The importance of critical thinking in VET is reflected in a letter to the Parliament from the Minister and Secretary of State of Education, Culture and Sciences. In this letter it is emphasized that education should enable students to become socially engaged, critical and independent members of society. In order to do this, discussion and debate have to be stimulated. In these kind of activities, critical reflection is important and it is an opportunity to show different perspectives. Critical thinking should make students more resilient and it may make dealing with different views in society easier. This is important, because values such as mutual understanding and tolerance have a central position in democratic states (Bussemaker & Dekker, 2015). It is not only the changing society which demands critical thinking of everyone, also the development of technology requires critical thinking of its users. There is an increasing amount of available information and students are expected to be able to judge whether information is reliable or not. For this purpose, it is of interest that critical thinking comes before assuming information to be true (Halpern, 2003).

The purpose of this bachelor's thesis is to analyse and describe the critical thinking process of VET level 2 students. Furthermore, conditions in which the critical process can be stimulated will be tested. In order to describe the critical thinking

process, different theories about the concept of critical thinking will be discussed in a literature study. Secondly, VET and its students will be discussed.

Critical thinking

Since the first academic research there is little consensus on what exactly is underlying in critical thinking. Several scientists have proposed definitions, and changed the definitions of their predecessors. This has led to a large number of both broad and more narrow definitions, which partly overlap, but also highlight different perspectives due to approaches of different disciplines. Most importantly, a distinction between the philosophical tradition and the psychological tradition can be made (e.g. Lewis & Smith, 1993; Lai, 2011). The philosophical tradition focuses on the attitudes and motivation which are important in critical thinking. This disposition is necessary in order to use critical thinking skills (e.g. McPeck, 1981; Ennis, 1985; Facione, 1990). The psychological tradition focuses on these skills (e.g. Sternberg, 1986; Halpern, 1998; Willingham, 2007).

This makes that critical thinking is often seen as a two-component conception in which both perspectives are present: "*Critical thinking is the ability to reason well and the disposition to do so*" (Bailin & Siegel, 2003). Both components are related, but differ conceptually. Integrating both perspectives seems to be necessary to get the full meaning of critical thinking (Torrington, 2011). Norris (1990) states that philosophers cannot do it alone. After all, it is about the psychological nature of mental abilities (Torrington, 2011). The ability can be seen as the capacities and skills, described in the psychological tradition. The disposition is the attitude and motivation, described in the philosophical tradition. Both concepts will be further discussed in next paragraphs.

The ability - The psychological tradition

The psychological tradition focuses on the behaviour that critical thinkers show. These can be seen as critical thinking skills (e.g. Sternberg, 1986; Halpern, 1998; Willingham, 2007). These include: reasoning and formulating effectively, to interpret, to analyse and synthesize information, to signal gaps in knowledge, being able to ask meaningful questions, to reflect critically on their own meaning and being open-minded to alternative views (Nationaal Expertisecentrum Leerplanontwikkeling, 2014).

From a psychological cognitive perspective critical thinking can be seen as a higher-order skill. This means that critical thinking is a complex activity, which is built up of lower level skills. These skills are often simpler and easier to acquire. But, if these skills are not completely present, it is less likely for an individual to think critically. For example, in order to respond critically to a text, an individual has to be able to read the

text and understand it well. Even only the comprehension of a text requires many skills: knowledge of vocabulary, understanding imagery, etc. (van Gelder, 2005).

Bloom (1956) proposed a taxonomy of information processing skills, which is based on the previous concept of lower and higher-order skills. The taxonomy consists of several behavioural levels. The first levels are required to reach the highest levels. It starts with levels about knowledge, remembering facts, interpreting information and using this knowledge. The three highest levels: analysis, synthesis, and evaluation are often considered as critical thinking (Bergsma, Brouwers, van der Laan, Legierse & Visser, 2006; Lai, 2011). At these levels the individual splits information in parts in order to see relations and to join parts together to create a new structure. It is also the ability to see or create connections between concepts, principles, concepts and theories. Evaluation is about giving judgements based on internal and external criteria. It is the ability to judge about the value of certain information based on criteria, principles and ideas.

It cannot be assumed that when someone obtains all lower skills to be able to think critically, really thinks critically. These skills also have to be combined. Van Gelder (2005) illustrates this with the example of comparing tennis with thinking critically. Playing tennis is a higher-order skill, to practice it you first need to obtain lower skills. So, first you have to be able to hit a forehand or backhand, run, toss a ball and keep the opponent in the eye. It is possible that someone practiced all these skills but still is not able to play the game. To be a good tennis player and to be able to play the game, you have to combine all the required skills. It is the same procedure for critical thinking. Lower skills have to be combined competently, to achieve a coherent result.

The disposition - The philosophical tradition

A disposition consisting of a certain attitude and motivation is needed in order to think critically (e.g. Facione, 1990). Siegel (1988) describes the attitude of a critical thinker as having a 'critical spirit'. It focuses on the required attitudes, dispositions, habits of mind, and character traits. There has to be a willingness to conform judgment and action to principle.

'Strong sense thinking' can be seen as an important element in this approach to critical thinking (Paul, 1992). This is the ability to ask deep questions about others and to look at different mindsets and compare it with one's own mindset. In order to do this a certain disposition is necessary: intellectual humility, courage, integrity, perseverance, empathy and fair-mindedness. Paul (1992) also makes the distinction between egocentric and sociocentric thinking. The development of egocentric and sociocentric thinking can be declared with Kohlberg's theory of moral development (1985), which will be discussed later. In order to think critically, an individual has to be aware of egocentric thinking.

This contains the fact that an individual observes the truth with his own direct view and first convictions (Paul, 1992). Ennis (1985) states that pragmatism is an important part of critical thinking in which the problem of egocentric thinking is absent. In pragmatic thinking the background is included when judging a statement. Hence a critical thinker has to be open-minded for observing this background, for example by meeting other cultures. For this an intellectual attitude is necessary in order to reflect critically on one's own and others' opinion (Torrington, 2011). To reach this, empathy is important. Empathizing makes it possible to understand someone's thoughts and viewpoints, because the individual takes the perspective of the other (Paul, 1993). Empathy is an affective reaction as a result of the assumption or understanding of someone else's emotional state or condition. It is comparable with the feelings of the other or the expected feeling (Eisenberg et al., 1994). A lack of empathy means that the individual cannot imagine what or how the other deals with something. As a result of this, the individual uncritically projects his or her own feelings on the other. Meta representations have to be formed in order to respond empathetically. Individuals should be able to understand how the other observes reality. Empathy implies that someone should be able to experience a situation like being the other. This requires adopting wishes, preference and beliefs from the other (Hoffman, 1987).

The attitude of a critical thinker can be associated with moral development. During moral development a transformation from self-oriented thinking to thinking in a broader context can be observed. With these concepts, the distinction between egocentric and sociocentric thinking that Paul (1992) made, can be clarified. Morality is the result of the development of thinking and judging based on justice, honesty and equality (Kohlberg, 1984; Rest, Narvaez, Thoma, & Bebeau, 2000). Moral thinking arises with cognitive structures which help by organising moral aspects of certain topics. By using these insights someone helps himself by thinking about moral issues in order to act in a moral way. After all, the aim is that students think critically in a way that ensures all values and norms of the society are considered. Values are reflected in one's own beliefs in politics, religion, money, friends, career, and self-respect (Wardekker, 2001).

Kohlberg (1984) divided moral development in three stages. Until approximately the age of 10 to 12 years old someone is learning what moral reasoning is in the pre-conventional stage. Thinking about right and wrong can be taught by operant conditioning and are results of reciprocal activities, so moral sense is based on consequences. The stage of children between 10 and 18 years old is called the conventional stage of moral reasoning. Making choices and the way of thinking is determined by someone's social environment and opinions of peers are important. Thinking is based on conformation, social expectations, laws and duties. The vision will be more independent at a later part of this stage. From 18 years the post-conventional

stage of moral reasoning can be reached. In this stage an individual thinks about values and norms which are given in socialisation. Thinking is based on deliberated and universal moral principles. The more social conscience someone has, the more he is able to watch at social systems with more distance. The person takes social and universal laws and individual interests into consideration (Holt et al., 2012).

Another important aspect of being disposed to think critically, is reflection of one's own thoughts and reflection on thoughts of others. It can be argued that metacognition is an important condition for these capacities. Metacognition is 'thinking about thinking'. Therefore, the own thoughts are monitored by the individual themselves (Martinez, 2006). Some scientists see critical thinking as a form of metacognition. Critical thinking about the own thoughts leads to the improvement of critical thinking skills (Flavell, 1979; Kuhn, 1999). Others see metacognition as a less essential part, but assume that metacognition is a way to monitor their own critical thoughts (Halonen, 1995).

In conclusion, it can be stated that critical thinking consists of two components: the skills and the disposition. To use critical thinking skills such as interpreting information, reasoning, arguing, and evaluating, a disposition is necessary. This is a certain attitude in which someone opens himself to learn about other points of view, without any preconceptions.

Based on this literature review both perspectives from the psychology and philosophy, the concepts the 'ability' and the 'disposition' can be further interpreted. In this the disposition can be seen as a necessity for being able to think critical, so for using the critical thinking skills. The critical thinking process can be divided in four phases.

1. Information processing

Information is needed to form a well-grounded judgement. This means that someone needs to have factual knowledge and has to signal gaps in knowledge. Furthermore, he has to be able to interpret information. This requires an inquisitive attitude (Bailin, Case, Coombs, & Daniels, 1999; Facione, 1990) in which someone has the desire to be well informed (Ennis, 1985; Facione, 1990).

2. Judging information

To make sure facts are true they have to be checked and judged. Someone has to look critical to gained information and judge if the source is reliable (Halpern, 2003).

3. Analysing

In order to use information in forming a well-grounded judgement, someone has to analyse and synthesize the gained information. It is important to see the different perspectives involved in the topic (Willingham, 2007; Lai, 2011). The disposition to use the skills in this phase in the right way consists of being open-

minded (Bailin et al., 1999; Ennis, 1985; Facione 1990; Halpern, 1998), being fair minded (Paul, 1993; Bailin et al., 1999; Facione, 1990), having the propensity to seek reason (Bailin et al., 1999; Ennis, 1985; Paul, 1992), being flexible (Facione, 1990; Halpern, 1998), having respect for others' viewpoints (Bailin et al., 1999; Facione, 1990) and having empathy and integrity (Paul, 1993).

4. Concluding

In this phase someone is telling his or her point of view. It can be the conclusion of arguments. In that case someone is able to formulate a well-grounded judgement. In this phase reflection is important (Case, 2005; Ennis, 1985; Facione, 1990; Lipman, 1988; Tindal & Nolet, 1995).

Critical thinking in VET students

Vocational Education and Training in the Netherlands

Vocational education and training has the aim to prepare students for their future in the society. Therefore, VET has three qualifications. At first, it has the requirement to educate students for a profession. Secondly, VET has to prepare students for further education. And finally, VET consists of civic education (MBO raad). VET can be seen as the 'foundation of the economy'. Approximately 40% of the Dutch working population has completed VET, so VET is an important supplier to the labour market (MBO raad). VET in the Netherlands consists of two different pathways. The first pathway is the school-based option, which mainly consists of education at school (Dutch: *BOL*) and the second pathway is the work-based option, which mainly consists of practical training (Dutch: *BBL*) (MBO raad).

VET consists of four different levels. This research will focus on critical thinking among students at the second level of VET. The second level is a basic vocational level in which students are trained to perform executive tasks. The study program lasts for two or three years. Not just one group of students enters VET level 2, the largest group, 60% of students entering VET level 2 come from preparatory secondary vocational education (Dutch: *VMBO b/VMBO k*) (open data 2014-2015, Dienst Uitvoering Onderwijs). Large differences exist in socio-economic background, competence and learning skills. This indicates a very diverse and mixed population of students at VET level 2 (Groenenberg & Hermanussen, 2012). As a result of this, it not possible to make general statements that apply to the entire population. Considering the degree of level 2, though, it can be assumed that some students at VET level 2 may have a more limited cognitive ability compared to the degree of higher levels of VET. The cognitive ability and socio-economic background are important factors in relation to learning (Dronkers, 2008). On the other side, considering the heterogeneity, some students may have a cognitive ability to be educated at a higher level of VET, but are attending level 2 due to other factors, for

example their attention span or lack of motivation (Lesterhuis, 2010; Groenenberg & Hermanussen, 2012).

A study of de Bruijn and Leeman (2011) indicates that the effectivity of educational approaches differ according to cultural and structural characteristics. These characteristics derive from individual unique characteristics of students, in interaction with characteristics of teachers. In general, educational approaches in VET level 2 focus on structure, interaction and clarity. This helps students who experience difficulties with working independently and those who are easily distracted. Information has to be provided in clear parts, so student can get to work immediately. Only a next part will be handed, when the previous part is finished. This means that work is divided in lot of steps in order to achieve a goal. When following the steps to achieve the goal is not possible, the work has to be divided in more parts in order to achieve the goal (Groenenberg & Hermanussen, 2012). However, due to the individual characteristics and the heterogeneous population not all students benefit the same educational approaches (de Bruijn and Leeman; Groenenberg & Hermanussen, 2012).

Results of a study of Groeneveld and Van Steensel (2009) on characteristics of VET students indicate differences between students at level 2 and students at level 3 and 4 in their sample. Among other differences in learning and information processing are observed. It turned out that students at VET level 2 in their sample may have more difficulties in working independently than students at level 3 or 4. Moreover, they seemed to be less critical to information sources than students at higher levels. In addition, students at VET level 2 sometimes do not have a realistic vision about their own ability in information processing compared to level 3 and 4 students, who are more critical concerning their own ability.

Based on previous mentioned assumptions, some VET level 2 students may be less skilled in critical thinking. After all, information processing and being critical to information sources are important elements of the critical thinking skills (e.g. Bloom, 1956; Lai, 2011). Secondly, based on the fact that the degree of level 2 is lower than level 3 and 4, some students may have a lower cognitive ability compared to students at higher levels, which may result in different levels of acquiring (cognitive) critical thinking skills. However, the population of students at VET level 2 is very heterogeneous, so acquiring critical thinking skills and information processing will definitely not be a problem for all students. In addition, the study of Groeneveld and van Steensel (2009) also showed that students within their sample felt concerned with problems. They felt more concerned with problems which exist in their own life world than abstract global issues. Feeling concerned with a problem may be an indication that students also think critically about these problems.

Problems in relation to critical thinking are acknowledged by teachers in a study to critical thinking in VET of the Expertise centre of VET. The study shows that more than 76% of the teachers think that their students are not yet skilled enough in critical thinking. Also more than 16% indicate that they think critical thinking is too ambitious for some students (Petit & Verheijen, 2015). Based on these results it can be concluded that the level of critical thinking of some students may be not adequate yet. But according to the disunity of the teachers it also turns out that VET has a very heterogenic population, in which levels of critical thinking will differ as well. Recognizing the increasing importance of critical thinking, it is meaningful to find circumstances to improve critical thinking (e.g. Bussemaker & Dekker, 2015; Rotherham & Willingham, 2010; Lai, 2011).

Based on the fact that training is needed to improve critical thinking (e.g. Kuhn, 1999; van Gelder, 2005), it will be look for conditions which may stimulate the critical thinking process. Based on the literature study two hypotheses are formulated relied on the expectations of factors that may stimulate the critical thinking process. The first hypothesis is: Offering a help structure which supports metacognitive skills, stimulates the critical thinking process. The second hypothesis is: Empathy stimulates the critical thinking process.

Stimulating metacognitive skills as a factor to stimulate the critical thinking process

Offering a help structure that supports metacognitive skills may stimulate the critical thinking process, since metacognition can lead to improvement of critical thinking (e.g. Kuhn, 1999). Additionally, offering a help structure that helps students to organize information and dividing a process in clear parts is similar to used didactic working methods in VET level 2. It may help stimulating the critical thinking process step by step. This method complements with the approach these students need. They benefit from structured methods due to the fact that some of them have a limited cognitive ability, compared to higher educated students, or due to social- or behavioural problems and a shorter attention span, they often experience benefits with structure, interaction and clarity (Lesterhuis, 2010; Groenenberg & Hermanussen, 2012).

Stimulating empathy as a factor to stimulate the critical thinking process

Empathy is important in understanding how someone else experiences a situation. This is part of an intellectual attitude, in which someone is open minded to other viewpoints and does not just focus on his or her own experience (e.g. Hoffman, 1987; Paul, 1993). According to this, stimulating the empathic capabilities should stimulate the critical thinking process. When students hear a personalized story and are confronted with experiences of others associated with an emotional perception, they may empathize which may make a topic easier to understand. When a topic becomes more concrete, it

may be easier to think critically of. In a study of Johnson (2012) students were stimulated to transport themselves into a story which resulted in exhibiting higher levels of empathy and being more likely to engage in prosocial behaviour.

This study will analyse how students at VET level 2 think critically about socio-political topics. Secondly, it will test the hypotheses about stimulating the critical thinking process. This will be done by interviewing students at VET level 2. The given answers will give insight into their critical thinking process.

Method

Sample

35 participants were interviewed in this study. Twenty-two were male and 13 were female. Participants were between 16 and 30 years old. The average age is 18 and SD is 1.884. The main part (45%) of the participants were 17 years old. All students were attending different studies at level 2. Eight participants were attending the study 'Helper in healthcare'. 5 participants were studying 'driving and transportation', 5 participants 'logistician', 5 participants 'IT employee', 5 participants 'furniture maker', 4 participants 'hairdresser', and 3 participants 'facility services'. Twenty-one participants attended the school-based pathway and 14 participants attended the work-based pathway. Participants attended their studies at five different VET schools in the Netherlands, in Den Bosch, Amersfoort, Spijkenisse, Zwolle and Amsterdam. All participants were informed about the procedure and had the option to ask questions about the research. The privacy of the participant was emphasized in the beginning of the interview.

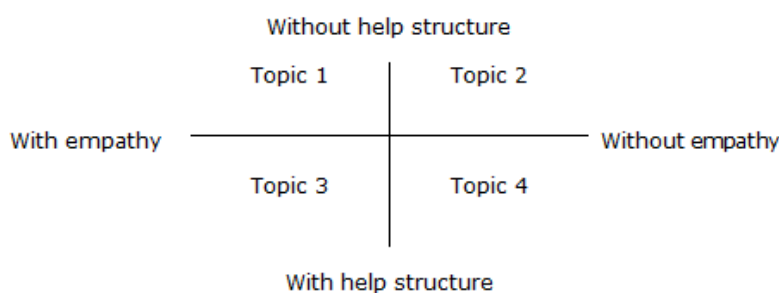
VET schools were approached to engage students at level 2 in the study. Schools were approached using the network of the Expertise Centre for VET. An information flyer was sent by email with the request to participate in the study. The study does not contain a representative sample. The selection of schools is based on convenience, all schools educate VET level 2 students and the locations of the schools in the Netherlands are diverse.

Procedure

To analyse how VET students of level 2 think critically, qualitative interviews were held. The interviews were based on short cases with factual information about four different socio-political topics: the refugee crisis, homosexuality, organ donation, and the legal age for drinking alcohol (see Appendix 1). These topics were chosen because they are socially and politically charged and ask for critical thinking. When drafting the cases, the level of the participant was considered. Short sentences were used and difficult terms were avoided. Potentially unfamiliar terms were explained. The cases were offered on paper and were read by the researcher. This reduced the impact of possible reading

problems of the participant. Also it did not appeal to the memory of the participant. If the participant could not remember a certain part of the case during the interview, it was possible to look back. The interviews had an average length of 20 minutes. The interview was based on a within-subject design in order to test the hypotheses. Three out of four conditions were manipulated, this means that each participant was tested in each condition (see Figure 1).

Figure 1:



In order to test the first hypothesis: Offering a help structure which relies on metacognitive skills stimulates the critical thinking process, two cases in the interview were manipulated by offering a help structure. The help structure consisted of questions based on metacognitive skills to stimulate the thinking process. Questions that were asked were: What do you know about this topic?; Why is this important; Why is this a problem?; Can you find a solution for solving the problem?; Why is this a good solution?; Why is this not a good solution? Questions are formed based on the ideas that using information in a well-grounded judgment is an important part of critical thinking and the idea that reflection is essential, in which a student focuses on weak points in their viewpoint. The content of these help questions are equal for every topic, but are formulated in a way that fits the content of the case.

To test the second hypothesis: Empathy stimulates the critical thinking process, two cases were manipulated as well. This was achieved by offering three elements which stimulate the empathic ability. At first, after reading the case with factual information about the topic, a person who is involved in the topic was introduced. In this way, the participant was confronted with the experiences and emotional perception of this person. The second way to include empathy was by visual support. There was shown a picture which showed the emotional state of the involved person. These pictures were derived from a database of pictures which evoke emotion (Machajdik & Hanbury, 2010). This database is based on the International Affective Picture System which contain pictures with high ratings of emotions (pleasure, arousal, and dominance). Lastly, empathy was evoked explicitly. This was done by asking the participant to imagine to be the person who is introduced in the case and to ask what the participant would feel in that position.

After reading the case and offering the manipulations (help structure and/or the elements which evoked empathy) in the manipulated conditions, the researcher asked the final questions: What do you think of this? And a statement about the topic was read and the participant was asked if he was a supporter or an opponent of the statement. By answering these questions the participant gave his or her own opinion on the topic of the case. The given answers gave insight into the critical thinking process of the participants. The distinction between questions asked before and the final question was made clear by the researcher by recording this answer with another recorder. Secondly, the researcher emphasized the importance that she had to understand why the participant thinks like this.

In addition, the emotional experience of the participant was measured in order to compare the emotional impact of different conditions. This was done by the Self-Assessment Manikin (SAM) (see Appendix 2). This is a method in which pictograms show levels of pleasure, arousal and dominance (Bradley & Lang, 1994). Three questions (How bad is this?; To what extent is this affecting you?; How important is this?) were answered by ticking the pictogram on the 0-5 scale which corresponded best by the emotional experience of the participant.

To analyse the thinking process as accurately as possible, the participant had to feel safe to answer honestly. This was realized by an open attitude of the researcher. This was done by creating a good ambiance, by asking short questions in advance to show interest in the participant and to make him feel at ease. To get insight into the thinking process, it was important that the participant answered as complete as possible. In order to achieve this, the researcher motivated the participant with body language, for example nodding and making eye contact. Also short questions, for example 'can you tell me more?' or 'can you explain this?' were asked to motivate the participant to further explain his or her answer (Lang & Van der Molen, 2012).

Measurement

All interviews were recorded, and the answers to the final questions of the 35 participants were transcribed. The analysis consisted of two parts. The first part was the qualitative analysis of the critical thinking skills, and the second part consisted of a quantitative analysis in order to test both hypotheses.

The interviews were transported to ATLAS.ti for the qualitative analysis. The search for critical thinking skills was done using different steps of coding. Firstly, the interviews were coded with open codes. These open codes were based on the literature review described in the theoretical framework of this Bachelor's thesis. The codes illustrated the four phases of critical thinking: information processing, judging the information, analysing, and concluding. Secondly, the interviews were further analysed bottom-up and the observed critical thinking skills were coded selectively (Boeije, 2012).

These selective codes were divided into the four phases, which led to a coding scheme (see Appendix 3). Coding the critical thinking skills gave insight into the content of each phase. After analysing the codes, the phases of the critical thinking process were described and illustrated.

The codes obtained with the qualitative analysis were quantified in order to test the hypotheses. The use of critical thinking skills (selective codes) were counted, which led to a list of frequencies. This gave insight into the amount of skills a participant used by answering the final questions. Secondly, the researcher scored the given arguments, conclusions and use of critical thinking skills in a holistic way with a grade (0-10 scale). The list of the frequencies of used critical thinking skills and the grade given by the researcher per case per participant was transported to SPSS in order to analyse the impact of the manipulated conditions. A multivariate analysis of variance (MANOVA) was used to examine the difference between the critical thinking process in empathy and/or help structure manipulated conditions and not manipulated conditions. Furthermore, principal component analysis was used to identify a set of components which can account for common and unique variance in all variables (Field, 2013).

Validity and reliability

A study is reliable when repeated measurement will lead to the same conclusions. This means that coincidental measurement defects occurring during observations have to be reduced (Boeije, 2012). The reliability of this study is ensured by describing the steps and details of the sample, procedure and measurement. Validity is a measurement of the existence of systematically distortions which occur in the study (Boeije, 2012). In this study, validity is ensured by coding the interviews blind, which means the researcher did not know which parts of the interviews took place in manipulated conditions.

Results

The results section of this study will be divided into two parts. At first, the qualitative analysis will describe the critical thinking process of the participants. Secondly, the quantitative analysis will focus on the effect of the manipulated conditions.

Qualitative analysis: The critical thinking process of VET level 2 students

In all interviews different critical thinking skills were observed. Coding the transcripts of the interviews gave insight into the content of the phases of the critical thinking process which were drafted based on the literature study. Each phase of the critical thinking process will be analysed and illustrated. Citations are translated from Dutch. The original citations in Dutch can be read in the appendix.

Phase 1: Information processing

Information about the topic is needed to form a well-grounded judgment. Arguments to support the point of view can be based on this information. In the arguments the participants rely among other things on facts. In this study all facts that the participants considered as true were coded as facts, also if the fact was not checked or may not be true. All participants used at least one fact in one of their argumentations. By using facts in the argumentation they process information to justify their point of views. This was done by mentioning facts in the argumentation: *"What is it called..., also the growth and development of your body, brains. That is restricted by alcohol. So if you don't drink alcohol, you have a better chance that your body and brains are better"*. The cases to introduce the topic also included factual information about the topic, such as the number of incoming refugees, reasons why alcohol is bad for health and the fact that there are long waiting lists for people who are waiting for organ transplantation. Some participants used this information in supporting their point of view. When the topic was introduced in the empathy manipulated condition, some participants referred to the introduced person. By doing this they referred to the seriousness of the topic: *"Yes, if I was a boy like that [refugee], I would also be scared and I also wouldn't like living in a country in which IS or whatever is, that's just, I would also think it's scary."*

Participants did not only use the facts contained in the information they were given, approximately 75% of the participants also referred to facts observed in their daily life: *"Here in Barneveld they are also building houses again. While eh, the normal Dutch people usually have to pay for it. And they [refugees] just get it."* The previous example used facts observed in the direct environment of the participant. Sometimes a participant declared that the topic had nothing to do with them or that they did not think about it. As this participant expresses: *"It is bad [organ donation]. But I don't deal with it. Nobody I know (...) You hear it, and you further don't do anything with it"*. The topic is not present in the daily life of the participant. This makes it less easy to gain information than in the cases in which experiences in daily life serve as information sources.

Phase 2: judging information

A large majority of the participants did not refer to the relevance of the facts or sources from which they heard the facts. In some cases a participant referred to a source, in particular the news on television was mentioned. For example in this interview: *"You see that on the news. They [refugees] are all complaining, the internet is bad and they complain about food."* Sources that serve as information in the daily life of the participants are their environment, such as their town or school and situations in their family or group of friends.

Judging the information is a skill that was only observed a few times in the given answers. One participant asked the researcher where the situation discussed in the case

took place, which can be seen as a question to check and judge the information. Another participant said she saw things on the news, used the facts in her argumentation but said afterwards that she was not sure if all the information was true: *"... but I think there were men like that in there, where they're all talking about on the news (can you explain this?). There happened a lot with them, they were raping people and that kind of stuff. If that's really true..., I don't know."*

Phase 3: analysing

Argumentation based on facts or experiences in daily life

In this phase participants use their insights into all available information. The aim is to mention arguments that provided the basis for their point of view. Different kinds of argumentation were observed. As discussed in the first phase, information (facts and observed situations in the daily life of the participant) are used to form a well-grounded judgement. In this case arguments are based on facts or on observed situations.

Arguments were not only based on facts or experiences. Different kinds of arguments were observed, which are divided into three groups: Arguments based on primary feelings, arguments based on relevant rules and beliefs in the eyes of the participant, and arguments based on universal principles.

Argumentation based on primary feelings

With the exception of two participants, all participants supported the point of view at least once by using his primary feelings in judging the value of a topic. In this case the participant had a certain opinion because it contained an emotional value. For example: *"It [the refugee crisis] has to stop. (Why?). Because it is bad."* or *"I would not choose to do it [becoming organ donor]. I don't like it, the idea."* In these cases the arguments are not explained further, but the participant considered judging the value by his feelings sufficiently. Finally, many arguments based on primary feelings contain the word 'just' (in Dutch: 'Gewoon') which means that no further explanation is needed. For example: *"It [legal age for drinking alcohol] just does not make sense"* and *"Bullying is just nonsense"*.

Argumentation based on relevant rules and beliefs

Furthermore, almost all participants based their arguments at least once on relevant rules and beliefs in the eyes of the participant. This can concern rules or duties applied in society. But it can also concern rules or beliefs that seem to be important according to the opinion of the participant. In this kind of argumentation commonly applied rules are mentioned, for example norms and values as in the next citation: *"Homosexuals, or lesbian women. They are also just human. I think they just have to act the way they are and how they feel (...). So I think that people that like the other gender, have to express themselves. They don't have to act differently because they can't be the*

way they are". The relevant rule in this citation is that people have to be and act how they are. Another example of a commonly mentioned rule in society is the fact that people have the freedom of choice. The following argument is based on this rule: *"No, I think you can make your own choice about that [organ donation]. I mean, yes, it's yours. And if you don't want it, then you don't have to do it in my opinion."*

In addition, relevant rules and beliefs can be based on someone's convictions, for example religious beliefs. Two respondents based their opinion on religious beliefs in the topics about homosexuality and organ donation. A point of view is chosen based on associated assumptions of the beliefs, which are not further explained: *"I don't think that..., men and women..., they are made for being together. It can't be in a different way. In my opinion. So I'm just against it. It just can't be like this (...). A man has to be with a woman, it's created like this in the beginning. It's a sin if you go against it."*

Argumentation based on universal principles

Basing argumentation on universal principles is less common. Ten out of the 35 participants used this kind of argumentation at least once. When a participant referred to universal principles, the individual interests and universal principles were kept in mind. This is different from only referring to relevant laws or rules, as in the previously mentioned kind of argumentation. In argumentation based on universal principles, a participant refers to the underlying principle of the relevant rule. For example: *"They can have an opinion, but you can't bully. Everybody is equal."* The participant explains the rule 'you can't bully' by referring to the underlying universal principle 'everybody is equal'.

Different perspectives

It can be meaningful to change perspective in order to understand different viewpoints of a topic. When a participant is doing this, he is reasoning in another way from another viewpoint. In this way, a participant refers to the counterarguments or is explaining why someone thinks this way. The majority mentioned more perspectives. Only 10 participants mentioned more than one perspective in every case. When a participant had insight into the relevant viewpoints, it sometimes resulted in reasoning in which two sides are mentioned. For example: *"On the one hand, it's really bad for these people because they have no home, no roof over their head and that kind of things. They just have to flee because it's not safe. Yes.. on the other hand, the Netherlands is getting fuller and fuller."*

When a participant understood a topic has more sides, in some cases he mentioned why someone else could think in a different way. This meant that he reasoned with another viewpoint with arguments to justify it: *"Then it's getting fuller and fuller. And the inhabitants won't get happier (...). Then they may have the feeling that they are*

stealing their country or something. In the Netherlands live a lot of different people. But, eh... I don't have any troubles with it".

Besides reasoning with another perspective, 13 of 35 participants put themselves into the perspective associated with the topic: *"Yes, imagine coming into another country, from the Netherlands to Syria for example. You don't know anyone".* The participant puts him or her into the situation in general. Some of the participants replaced themselves with the person introduced in the empathy manipulated conditions: *"... that is mentioned here, that they don't want to walk holding hands anymore. If I would do that and someone would call 'lesbian! Lesbian' I would also think like, yes okay I will stop holding hands. But that's bad, I think that's really sad."*

Phase 4: Concluding

In this phase the participant mentioned the point of view. It often directly followed as an answer on the final question: 'What do you think of this?'. Thereafter the point of view that was mentioned was supported further by giving arguments (as described in the third phase: analysing). It also happened that the participant started by giving arguments and concluded with the point of view. Only one participant did not want to give his opinion about the topics homosexuality and organ donation. After the interview he explained the reason of this was because of his religious beliefs.

As mentioned before, some arguments were based on primary feelings. This meant that a participant based the arguments on primary feelings, such as fear. But in other cases, a primary feeling can be mentioned in a point of view, which will be later supported with arguments. For example: *"Yes I think it's good [finding a solution to discrimination]. Everybody has to feel safe when walking at the streets."*

As mentioned in phase three as well, some participants include different perspectives in their reasoning. This sometimes made it hard to conclude and choose one point of view. As a result of this, a participant sometimes mentioned an addition after the point of view. For example: *"And if they have to go to the hospital, it's their own fault, isn't it? (...) They want to drink alcohol. Yes, they have to decide it with the parents."* In this case the participant thought the person is responsible himself for drinking alcohol, but later he mentioned that the responsibility for drinking alcohol has to be shared with the parents, which is complementary to the mentioned point of view. A majority of the interviewed participants did mention a solution to improve the situation or to comply with the addition to the point of view at least once: *"Hmm, I would be against making it [organ donation] obligated. But I think more people should hear how important it is. By commercials, that makes people more aware."*

Based on the literature study different phases of critical thinking were expected to be observed. All phases were observed to more or less extent. A notable result is the second phase: Judging the information is a skill that was not observed often. Secondly, it has to be mentioned that large differences between participants were observed. Some interviews were longer than others. Also the amount of questions the researcher asked in order to motivate the participant to answer more compulsory differed. This had among other things to do with the difficulty of the task to form an opinion. Participants sometimes told the researcher they did not know what to think about the topic, or referred to different perspectives to show they had difficulties by choosing one side. Also the motivation differed between participants.

Quantitative analysis: The effect of the manipulated conditions to the critical thinking process of VET level 2 students

In order to describe the average scores in each manipulated condition, the conditions are divided in groups with and without manipulation (empathy and help structure). At first, the results of the help structure manipulated conditions will be tested and secondly will be focused on the empathy manipulated conditions. Average scores of both groups are shown in tables 1 and 2 and will be discussed.

The role of the help structure as manipulation

According to the hypothesis: Offering a help structure which supports metacognitive skills, stimulates the critical thinking process, it would be expected that scores in the help structure manipulated conditions are higher than the scores in the conditions without help structure. A MANOVA was conducted in order to investigate any significant differences caused by the help structure manipulated conditions. Findings show there was no significant effect of the manipulation (help structure versus no help structure) on the dependent variables (see Table 1), $F(14, 123) = 1.64, p = .09, \text{partial } \eta^2 = .157$. For some observed skills it turned out to be the opposite, although the differences between the mean scores are small and not significant (see Table 1).

Due to the fact the help structure was based on metacognitive skills, it was expected that the participant spent more time thinking about the topic and would use more facts in the argumentation to form a well-grounded judgement. However, non-significant results showed that participants used more facts when they the help structure was not provided. Also they referred less to situations in their daily life if the help structure was not provided. But the participants used the other kind of arguments (arguments based on primary feelings; rules and beliefs; and universal principles) more in the conditions with help structure. But also the differences between these mean scores are small and not significant.

Table 1

<i>Average scores in conditions with and without help structure</i>				
Dependent variables	With help structure		Without help structure	
	M (SD)	N	M (SD)	N
Refers to fact	1.27 (1.10)	70	1.47 (1.27)	70
Refers to situation in daily life	.37 (.73)	70	.63 (.90)	70
Source fact	.11 (.36)	70	.14 (.39)	70
Source daily life	.17 (.45)	70	.09 (.28)	70
Judges source	.00 (.00)	70	.01 (.12)	70
Perspectives	1.66 (.54)	70	1.61 (.55)	70
Takes perspective	.16 (.37)	70	.19 (.39)	70
Primary feelings	.89 (.75)	70	.69 (.60)	70
Rules and beliefs	.79 (.82)	70	.70 (.81)	70
Universal principles	.13 (.41)	70	.07 (.31)	70
Total arguments	3.44 (1.56)	70	3.56 (1.33)	70
Addition to point of view	.26 (.47)	70	.23 (.42)	70
Solution	.24 (.49)	70	.23 (.49)	70
Subjective grade by researcher	6.12 (.85)	70	6.21 (.92)	70

The role of empathy as manipulation

According to the hypothesis: Empathy stimulates the critical thinking process, it would be expected that the average scores in the empathy manipulated conditions were higher. This was expected because the empathy manipulation would influence pleasure, arousal and dominance which in turn would increase perspective taking and critical thinking. The manipulation was tested by asking the emotional experience of the participant by using the SAM scale. A MANOVA was conducted in order to investigate significant differences in emotional experiences caused by the empathy manipulated condition. It turned out there was no significant effect of the manipulation (empathy manipulated versus not empathy manipulated) on the overall emotional experience (pleasure, arousal and dominance), $F(3, 136) = 3.84, p = .011, \text{partial } \eta^2 = .078$. However, it was found that the empathy manipulated conditions led to statistically significant less pleasure, $F(1, 138) = 10.79, p = .001, \text{partial } \eta^2 = .072$.

A MANOVA was conducted. Findings showed there was no significant effect of the manipulation (empathy manipulated versus not manipulated) on the dependent variables (see Table 2), $F(14,123) = .447$, $p = .955$, partial $\eta^2 = .048$.

For some skills it turned out to be opposite (see Table 2), even though these differences are very small and not significant. An important part in empathy is taking someone else's perspective. The results show a small difference between both conditions. Participants reason from a little more perspectives in conditions manipulated with empathy than in conditions without empathy. The difference between both conditions is very small as well and not significant. The other important element in empathy is putting yourself in another perspective, but the results show almost no difference between the scores in both conditions. It was expected the participant used more arguments based on primary feelings because the participant is confronted with emotional feelings of the person introduced in the case. However, the number of participants using this kind of argument is almost the same in both conditions.

Table 2

<i>Average scores in conditions with and without empathy</i>				
Dependent variables	With empathy		Without empathy	
	M (SD)	N	M (SD)	N
Refers to fact	1.14 (1.26)	70	1.34 (1.13)	70
Refers to situation in daily life	.50 (.83)	70	.50 (.83)	70
Source fact	.19 (.46)	70	.07 (.83)	70
Source daily life	.13 (.38)	70	.13 (.38)	70
Judges source	.01 (.12)	70	.00 (.00)	70
Perspectives	1.69 (.53)	70	1.59 (.55)	70
Takes perspective	.16 (.37)	70	.19 (.39)	70
Primary feelings	.80 (.75)	70	.77 (.68)	70
Rules and beliefs	.74 (.74)	70	.74 (.88)	70
Universal principles	.09 (.33)	70	.11 (.401)	70
Total arguments	3.53 (1.49)	70	3.47 (1.49)	70
Addition to point of view	.21 (.41)	70	.27 (.48)	70
Solution	.24 (.49)	70	.23 (.49)	70
Subjective grade by researcher	6.16 (.80)	70	6.18 (.80)	70

Factor analysis

Cronbach's Alpha is a measure of internal consistency of a set of items.

Cronbach's Alpha for the 14 measured skills was .53. Ideally, Cronbach's Alpha should

be above .7 to be considered acceptable. This means all variables are not ideally internally consistent.

Principal component analysis (PCA) is used to develop a reduced set of component scores. PCA seeks a set of components which can account for common variance in a set of variables. It was indicated that five underlying factors (with Eigenvalues exceeding 1) were identified. In total, these factors accounted for around 61% of the variance in the data. Based on the factor analysis, two factors were drafted and used in order to further analyse differences between the manipulated conditions. The first factor had relatively high loadings on variables that seem to deal with information procession (referring to facts and situations in daily life, and mentioning sources). The second factor had relatively high loadings on variables that deal with emotional and empathic capabilities (amount of perspectives, taking perspective, and using arguments based on primary feelings). Cronbach's alpha for the factor information processing is .390 and for the factor with emotional and empathic capabilities .205. Both scores are low. This means there is little intern consistency in underlying variables, but based on literature the variables are related.

A one-way between groups analysis of variance (ANOVA) was used to investigate any significant differences caused by the manipulations on both factors. Findings show that there were no significant differences caused by the help structure manipulated conditions on the information processing factor, $F(1,138)=1.672$, $p=.198$, partial $\eta^2=.01$, and not on the factor with emotional and empathic capabilities, $F(1,138)=1.538$, $p=.217$, partial $\eta^2=.01$.

Secondly, it was investigated whether both factor scores differed significantly caused by the empathy manipulated conditions. No significant effects were found in the factor scores of the information processing factor, $F(1,138)=.304$, $p=.582$, partial $\eta^2=.00$, and not on the factor with emotional and empathic capabilities $F(1,138)=.332$, $p=.565$, partial $\eta^2=.00$.

Topics

In conclusion, no significant differences were found between the mean scores caused by the manipulated conditions. Given the fact that each interview consisted of four cases about four different topics (refugee crisis, homosexuality, organ donation, and the legal age for drinking alcohol), differences between the topics were analysed as well. A MANOVA was conducted in order to determine whether the topic had influence in stimulating the critical thinking process. Findings showed a significant effect of the conditions on the dependent variables, $F(36,138)=4.63$, $p<.001$, partial $\eta^2=.305$.

Analysis of the variables individually showed significant differences between scores on referring to facts between different topics, $F(3,136)=16.86$, $p<.001$, partial η^2

=.647. Descriptive statistics show the differences between scores between topics. It turned out that participants referred on average 2.09 (SD=1.31) times to facts when the refugee crisis was discussed. The average amount of referred facts when homosexuality was discussed was notably lower (M=.54, SD=.74). Also the difference between referring to a situation in daily life turned out to be statistically significant between the topics, $F(3,136)=9.92, p < .001, \text{partial } \eta^2 = .271$. Participants referred most to situations in their daily life when the legal age for drinking alcohol was discussed (M=1.00, SD=1.10) and less when homosexuality was discussed (M=.17, SD=.45). Finally, participants put themselves notably more in perspective when the refugee crisis was discussed (M=.43, SD=.502) than when the legal age for drinking alcohol was discussed (M=.03, SD=.169). Differences between taking another perspective and putting yourself in a perspective between the topics were found statistically significant, $F(3,136)=8.89, p < .001, \text{partial } \eta^2 = .164$.

Discussion

This study gained insight into the critical thinking process of students at VET level 2 based on a small sample of 35 participants. Results were in line with the expectation that the observed processes between participants were very diverse due to the heterogeneous population at VET level 2 (e.g. Groenenberg & Hermanussen, 2012). It turned out that it is possible to think critically in many ways. As a result of this it is not possible to sketch one general critical thinking process which all students at VET level 2 use.

Different critical thinking skills were observed and it turned out that the skills were in line with the skills that were mentioned in the literature regarding critical thinking. Thus, it can be confirmed that the critical thinking process of the students in this sample consists of four different phases in which different skills are applied. The phases are: information processing, judging the information, analysing, and concluding. However, all participants used these phases in different ways. Not all participants were observed to follow the phases in a linear process. Sometimes a participant started by mentioning the point of view (phase four) and used skills such as referring to facts (phase one) later to support the already mentioned point of view. In addition, not all participants showed critical thinking skills in every phase. This means that some participants skipped a part of the ideal critical thinking process. A phase that many participants skipped, was the phase in which information had to be judged. This is in line with the results of the study of Groeneveld and van Steensel (2009), which showed that some students at VET level 2 seemed to be less critical to information sources than students at higher levels.

Large differences were observed between the participants in the use of arguments. It turned out that some of the participants could mention more than one fact

and others mentioned they did not yet know much about the topic. Also the different living environments of the participants seemed to lead to differences in the critical thinking process. Some participants mentioned situations in their daily life in which they were also confronted with the topic discussed. Others mentioned that they were not familiar with the topic in their daily life or had not heard about it before. The lack of knowledge about a topic sometimes resulted in less use of argumentation. This confirms the importance of knowledge in order to think critically. Differences were observed in the use of arguments based on facts between the topics. In general, participants referred most to facts or experiences in daily life when the refugee crisis or the legal age for drinking alcohol was discussed. This may be an indication that these topics exist in their direct environment. The study of Groeneveld and van Steensel (2009) showed that students at VET level 2 felt more concerned with problems that exist in their own life than abstract problems. Hence, organ donation and homosexuality can be seen as more abstract topics about which it was less easy to use information to support the point of view.

Hence it can be concluded that the level of knowledge about the topics was not the same and thus the topic influenced the critical thinking process as well. This finding is in line with theorists that consider critical thinking as a domain-specific skill (e.g. Ennis, 1989; McPeck, 1990; Bailin et al., 1999). Bailin et al. (1999) argue that domain-specific knowledge is essential for being able to think critically. This is the case because of the types of explanation, evaluation and the evidence which usually vary by domain. Also McPeck (1990) clearly states that critical thinking skills are not transferable to other contexts. The subject can never be 'comprehensive and universal', but is always specific. Hence, the topics discussed in the interviews were specific as well, which resulted in differences in applying critical thinking skills in every topic.

Besides basing arguments on facts or experiences observed in daily life, participants based their arguments on primary feelings, rules and beliefs, and universal principles. These seemed to be in relation with moral development since moral thinking is based on justice, honesty and equality (Kohlberg, 1984; Rest et al., 2000) and it considers values and norms in society (Wardekker, 2001). It can be concluded that when a participant was arguing based on primary feelings, he sometimes saw no need for further explanation because the (emotional) primary feeling was a crucial and dominant reason. This can be the result of personal involvement in the topic or feeling affected with the situation, which was sometimes reflected in repeating the primary feelings more than once. When the point of view or primary feeling was further explained by mentioning rules or beliefs, it can be considered as a characteristic of the conventional stage of moral reasoning (Kohlberg, 1984; Holt et al., 2012) because that means that the argument is based on norms or values. Considering Kohlberg's theory of moral

development, arguing based on universal principles can be seen as a higher-order skill, which would be present in the post-conventional stage of moral reasoning. When a participant considered universal principles he had an overview of the situation and saw the underlying reasons for norms, values, rules and beliefs.

Furthermore, it was investigated whether stimulating empathy or metacognitive skills stimulated the critical thinking process. The results showed no significant effects between the amount of used critical thinking skills caused by the help structure or empathy manipulated conditions. This means that the way metacognition or empathy was stimulated did not lead to significantly more use of critical thinking skills.

In the help structure the participant answered several questions in which metacognitive skills were stimulated. By answering these questions, participants mentioned a lot that could also be used later by supporting the point of view in the final question. The results showed that this was not the case, the participants referred even less to facts or experiences in daily life in manipulated conditions. It could be that the participants did not see the aim to using the already mentioned information again. It could feel like doing something twice. Another explanation of this may be a lack of synthesis. Bloom (1956) referred to this skill as a higher-order thinking skill in his taxonomy of information processing. Synthesizing information is the ability to see or create connections between information in order to use it. When a participant mentioned facts in his answers in the help structure, but did not apply it in order to support his point of view, it can be concluded that he did not have the ability to synthesize it yet. Although the quantitative analysis showed no significant effect, the qualitative analysis of the critical thinking process indicated the importance of metacognitive skills: the more or harder the student thought about a topic, the more he was able to mention.

In addition, the quantitative analysis showed no significant differences in used critical thinking skills caused by the empathy manipulated conditions. But the mean scores showed that the manipulation lead to noticing more perspectives, which is an important element of critical thinking (e.g. Paul, 1993). The qualitative results showed that the offered perspective in the manipulation can be seen as a tool for some participants, because referring to this perspective helped them in reasoning from this perspective. Furthermore, the self-reported pleasure turned out to differ significantly between empathy manipulated and not manipulated conditions. This means that participants were affected by the emotional perception of the introduced person as described in the case. So, it can be concluded that the manipulation stimulated the disposition of a critical thinker, since empathy is considered as an element of this disposition (e.g. Paul, 1993). However, the empathy manipulated condition did not lead to applying more critical thinking skills. Thus, being disposed to think critically, does not

automatically lead to critical thinking. Which is in line with the used definition of critical thinking, besides the disposition to be a critical thinker, a person needs to have the ability to apply the critical thinking skills (Bailin & Siegel, 2003).

Critical thinking was introduced with an evolutionary perspective: "*Humans should just think logically enough to survive.*" It turned out that critical thinking is considered of great importance in 21st century and is now necessary to survive due to the rapidly changing society (e.g. Rotherham & Willingham, 2010). With the conclusion that the participants in this sample used critical thinking skills, to more or less extent and in different ways, it can be stated that they are able to survive in this 21st century. But the results also show that not all participants applied critical thinking skills in every phase of the critical thinking process and thinking critically about abstract topics seemed to be harder. However, since critical thinking requires training (e.g. Kuhn, 1999; van Gelder, 2005) there is always room for improvement. Based on the results, several recommendations to improve or stimulate the critical thinking process will be made below.

Recommendations

It turned out that offering a perspective like it was done in the empathy manipulated conditions was effective in improving empathy. This means the disposition to be a critical thinker was stimulated. However, critical thinking does not just consists of a disposition, the other component of critical thinking is the ability (Bailin & Siegel, 2003). In order to stimulate the ability more training is needed. Training critical thinking skills may be easier when someone already improved the disposition, for example by being more empathic. Being empathic makes it easier to be open-minded to other perspectives and to socio-centric thinking (e.g. Ennis, 1985; Paul, 1993).

Training the ability to think critically can be realized by a help structure as used in this study. But the results show that the level of critical thinking differs, so the heterogeneity of the population has to be considered in offering coaching. The help structure needs to be consistent with the needs and level of the student. This means the help has to be more personalized than the help structure that was used in this study, because the researcher observed differences in the way the participants answered the questions. For some participants the questions appeared to be easy, because they were able to answer quickly and comprehensively. This group should be stimulated in another way. Others had to think about their answers and sometimes told the researcher that they did not know an answer. They may benefit from a help structure in which more structure or coaching is offered.

Furthermore, it was concluded that not all mentioned information during answering the questions in the help structure was later processed in the arguments in order to form a well-grounded judgement. Thus, students should be coached in using information in forming arguments. A recommendation for using help structures in education for stimulating critical thinking would be to integrate questions about general information and questions to the point of view. With this integration the relation between information and point of views may become clear, which could help in processing the information.

It was concluded that not all participants attained the same level of factual knowledge, which is important in understanding and judging topics. As a result of this, education should provide information in a way that students feel addressed. It turned out that thinking about abstract topics may be harder than thinking about concrete problems. So, the aim would be to make abstract topics more concrete and visible in the direct environment of the students.

In addition, it was concluded that thinking critically about socio-political topics seems to be domain-specific. This means coaching is required in making the transfer to use the critical thinking skills in different contexts. Furthermore, offering just one perspective in order to improve the disposition to think critically by improving empathy is not enough. For this, the transfer to different topics is necessary as well. The teacher has an important role in making the transfers to different contexts (van Gelder, 2005).

Finally, it has to be considered that critical thinking should focus on 'how' a student thinks, instead of 'what' he thinks. In offering help structures or other perspectives it should always be considered that the aim is to improve how a student thinks. Although the aim should not be to change the point of view, but offering other perspectives can lead to change in the way a student thinks.

Further research

It is important to realize that the current findings are based solely on an analysis of 140 argumentations of 35 participants. To be able to make more generalizable statements, research should be based on a larger sample.

Further studies could focus on the impact of peers or the impact of classroom interaction while using critical thinking skills, because people get the ideas from the environment (Bacon, 1974). During the interviews, the researcher experienced that almost all students were very willing to answer completely and were able to give the own opinion. It would be interesting to gain insight into the difference between the individual interview and an interview with a bigger group or observation during a lesson in which similar topics are discussed and students are asked to give their opinion. Furthermore, it would be interesting to gain insight into the effectiveness of more personalized help

structures with questions based on metacognitive skills. Because this way every student can attain the coaching they need in order to think critically which is important in 21st century.

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Appendix 1 Cases in Dutch

Condition with stimulating empathy



De vluchtelingencrisis

Veel vluchtelingen komen naar Europa. Bijvoorbeeld uit Syrië, Afghanistan en Irak.

Zij moeten vluchten doordat hun land niet veilig is. Er komen nog steeds meer vluchtelingen. In 2016 zeker 3 miljoen extra. Het lukt veel Europese landen niet om slaapplekken te regelen voor de vluchtelingen. Daarom worden ze soms bij de grens tegengehouden. Farid is zo'n vluchteling. Hij is 12 en komt uit Syrië. Er waren bomaanslagen vlak bij zijn huis. Hierdoor zijn zijn vader en moeder doodgegaan. Zijn zusje en hij waren bang en verdrietig. Ze besloten naar Europa te gaan. Ze gingen met een klein bootje. Dat was heel eng, want er verdrinken veel mensen daardoor. Nu wonen Farid en zijn zusje in Nederland. Hij vindt het vreemd om nu hier te zijn. Hij mist zijn familie en vrienden.

Condition without stimulating empathy

De Vluchtelingencrisis

Veel vluchtelingen komen naar Europa. Bijvoorbeeld uit Syrië, Afghanistan en Irak. Zij moeten vluchten doordat hun land niet veilig is. Soms komen ze op illegale manieren naar Europa. Bijvoorbeeld met onveilige bootjes of stiekem in vrachtwagens. Er komen nog steeds meer vluchtelingen. In 2016 zeker 3 miljoen extra. Het lukt veel Europese landen niet om slaapplekken te regelen voor de vluchtelingen. Daarom worden ze soms bij de grens tegengehouden

Condition with stimulating empathy



Homoseksualiteit

Homoseksuele mannen en lesbische vrouwen krijgen vaak te maken met discriminatie. Dit betekent dat ze

bijvoorbeeld worden uitgescholden of worden gepest. Soms kiezen ze er dan voor om niet te laten zien dat ze homoseksueel zijn. Tim en Bob zitten bij elkaar in de klas en hebben een relatie. Ze liepen vaak hand in hand door de gang. Andere leerlingen lachten hen dan uit en riepen dingen. Ook zijn hun fietsbanden lek gestoken. Tim en Bob voelen zich onveilig. Ze zijn bang dat het erger wordt. Ze durven niet meer te dicht bij elkaar te zijn op school. Dit maakt hen verdrietig.

Condition without stimulating empathy

Homoseksualiteit

Homoseksuele mannen en lesbische vrouwen krijgen vaak te maken met discriminatie. Dit betekent dat ze bijvoorbeeld worden uitgescholden of worden gepest. Soms kiezen ze er dan voor om niet te laten zien dat ze homoseksueel zijn. Ze lopen dan bijvoorbeeld niet meer hand in hand over straat. Want hier kunnen mensen vervelend op reageren.

Condition with stimulating empathy**Orgaandonatie**

In Nederland kan je zelf kiezen of je donor wil zijn. Dit betekent dat je organen na je dood kunnen worden

gebruikt. Bijvoorbeeld voor iemand met een ziek orgaan. Als je een ziek orgaan hebt kom je op een wachtlijst voor een donororgaan. Nog niet iedereen in Nederland heeft aangegeven of hij donor wil zijn. Lotte heeft een ziekte aan haar nieren. Hierdoor moet ze heel veel naar het ziekenhuis. Ze kan ook niet elke dag naar school en is vaak moe. Dit vindt ze heel erg, het maakt haar verdrietig. Ze wil naar school en leuke dingen met vrienden doen. Ze wacht al 5 jaar op een donornier. Met een nieuwe nier kan ze weer vaker naar school en leuke dingen doen.

Condition without stimulating empathy**Orgaandonatie**

In Nederland kan je zelf kiezen of je donor wil zijn. Dit betekent dat je organen na je dood kunnen worden gebruikt. Bijvoorbeeld voor iemand met een ziek orgaan. Als je een ziek orgaan hebt kom je op een wachtlijst voor een donororgaan. Nog niet iedereen in Nederland heeft aangegeven of hij donor wil zijn. De wachtlijsten voor donororganen zijn heel lang. Mensen met een ziek orgaan moeten dus lang wachten.

Condition with stimulating empathy**Alcoholleeftijd**

In Nederland moet je 18 zijn om alcohol te kopen. 2 jaar geleden mocht dit al als je 16 of 17 was. Dit is veranderd om alcoholmisbruik te voorkomen. Het leidt vaak tot problemen. Bijvoorbeeld agressie in het uitgaansleven of verkeersongelukken. Ook is alcohol

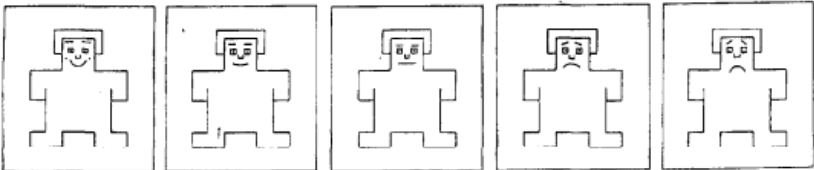
schadelijk voor de gezondheid. Het is vooral schadelijk voor jongeren. Kim is 17. Al haar vrienden zijn 18 of ouder. In het weekend gaan zij naar een café. Om daar in te komen moet je 18 zijn en je id laten zien. Er wordt daar alcohol gedronken. Kim kan dus niet mee. Kim vindt dit heel jammer en het maakt haar boos. Ze wil ook mee! Ze vindt dat ze hetzelfde is als haar vrienden van 18.

Condition without stimulating empathy**Alcoholleeftijd**

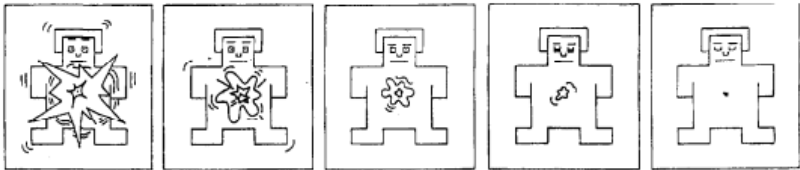
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Appendix 2
Self-Assessment Manikin (SAM)

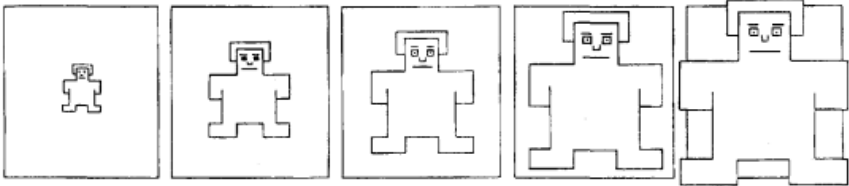
How bad is this?



To what extent is this affecting you?



How important is this?



Appendix 3 Code tree

Phase 1: Information processing	Refers to a situation in daily life	
	Refers to fact	
Phase 2: Judging information	Testing reliability	- Asking questions
	Mentions source situation in daily life	- Direct environment; - school; - family; - friends; - close friends; - heard about it
	Mentions source fact	- Media; - Heard about it; - Factual information given in case; - Situation of the person introduced in the case
Phase 3: Analysing	More perspectives/ perspective taking	- on the one hand- on the other hand reasoning; - Reasoning from another point of view; - Reasoning from the viewpoint of the person introduced in the case; - Puts himself into the situation; - Puts himself into the situation of the person introduced in the case
	Argumentation	- Arguments based on primary feelings; - Arguments based on relevant rules and beliefs in the eyes of the participant; - Arguments based on universal principles; - Arguments based on fact (see phase 1); - Arguments based on experience in daily life (see phase 1); - Not in daily life
Phase 4: Concluding	Point of view	- Chooses point of view; - Mentions addition; - Mentions solution

Appendix 4 Citations in Dutch

"What is it called..., also the growth and development of your body, brains. That is restricted by alcohol. So if you don't drink alcohol, you have a better chance that your body and brains are better".

"Yes, if I was a boy like that [refugee] I would also be scared and I also wouldn't like living in a country in which IS or whatever is, that's just, I would also think it's scary."

"Here in Barneveld they are also building houses again. While eh, the normal Dutch people usually have to pay for it. And they [refugees] just get it."

"It is bad [organ donation]. But I don't deal with it. Nobody I know (...) You hear it, and you further don't do anything with it".

"You see that on the news. They [refugees] are all complaining, the internet is bad and they complain about food."

"... but I think there were men like that in there, where they're all talking about on the news (can you explain this?). There happened a lot with them, they were raping people and that kind of stuff. If that's really true..., I don't know"

"It [the refugee crisis] has to stop. (Why?). Because it is bad."

"I would not choose to do it [becoming organ donor]. I don't like it, the idea."

"It [legal age for drinking alcohol] just does not make sense"

"Bullying is just nonsense".

"Homosexuals, or lesbian women. They are also just human. I think they just have to act the way they are and how they feel (...). So I think that people that like the other gender, have to express

"Hoe heet het, ook qua groei en ontwikkeling van je lichaam, hersenen. Dat wordt afgeremd door alcohol. En als je dus geen alcohol drinkt, dan heb je dus een betere kans dat je lichaam en je hersenen beter is".

"Ja, als zo'n jongetje zijnde zou ik ook bang zijn en zou ik ook niet in een land willen wonen waar IS of wat dan ook zou zijn, dat is ook gewoon, dat zou ik ook gewoon doodeng vinden."

"Hier in Barneveld zijn ze ook weer huizen aan het bouwen enzo. Terwijl eh, de gewone Nederlanders gewoon ervoor moeten betalen. En hun krijgen het gewoon."

"Is vervelend [orgaandonatie]. Maar ik heb er zelf helemaal niks mee. Niemand die ik ken (...) Je doet er verder niks mee. Je hoort het, en je doet er verder niks mee."

"...dat zie je wel eens op het nieuws, dan zijn ze [vluchtelingen] allemaal aan het zeuren, te weinig internet en te weinig eten."

"...maar ik denk ook wel dat er echt mannen tussen zitten, waar het op het nieuws allemaal over gaat. (Kan je dit uitleggen?) Ja daar is van alles mee gebeurd, dat ze mensen gingen verkrachten enzo. En of dat nou echt is of niet..., ik weet het niet."

"Het [de vluchtelingencrisis] moet wel stoppen. (Want?) Het is erg."

"Ik zou er [orgaandonor worden] zelf niet voor kiezen. Ik vind het geen fijn idee."

"Het [alcoholleeftijdsgrens] is gewoon onzin."

"Pesten is gewoon onzin."

"Homoseksuelen, of lesbische vrouwen. Dat zijn ook gewoon mensen. Ik vind dat ze zich gewoon moeten kunnen uiten zoals ze zijn en zoals ze zich voelen. (...) Dus ik vind gewoon dat mensen die op het

themselves. They don't have to act differently because they can't be the way they are".

"No, I think you can make your own choice about that [organ donation]. I mean, yes, it is yours. And if you don't want it, then you don't have to do it in my opinion."

"I don't think that..., men and women..., they are made for being together. It can't be in a different way. In my opinion. So I'm just against it. It just can't be like this (...). A man has to be with a woman, it is created like this in the beginning. It's a sin if you go against it."

"They can have an opinion, but you can't bully. Everybody is equal."

"On the one hand, it's really bad for these people because they have no home, no roof over their head and that kind of things. They just have to flee because it's not safe. Yes.. on the other hand, the Netherlands is getting fuller and fuller."

"Then it's getting fuller and fuller. And the inhabitants won't get happier (...) Then they may have the feeling that they are stealing their country or something. In the Netherlands live a lot of different people. But, eh... I don't have any troubles with it".

"Yes, imagine coming into another country, from the Netherlands to Syria for example. You don't know anyone".

"... that is mentioned here, that they don't want to walk holding hands anymore. If I would do that and someone would call 'lesbian! Lesbian' I would also think like, yes okay I will stop holding hands. But that's bad, I think that's really sad."

"Yes I think it's good [finding a solution to discrimination]. Everybody has to feel safe when walking at the streets."

andere geslacht vallen moeten zich gewoon kunnen uiten. Ze moeten zich niet hoeven inhouden omdat ze niet kunnen zijn wie ze zijn. Iemand voelt zich zoals ie is."

"Nee, ik vind dat je daar [orgaandonatie] een keuze zelf in mag maken. want ja, het is toch van jou. En als je het niet wil, dan hoeft dat niet vind ik".

"Ik vind niet dat.., de man en de vrouw..., die zijn zo gemaakt bij elkaar. Het kan niet anders. Vind ik. Dus ik ben daar gewoon tegen. Het kan niet. (...) De man hoort bij de vrouw, zo is dat geschapen aan het begin. En het is gewoon zonde als je, als jij er tegenin gaat."

"Ja. Ze kunnen een mening geven, maar niet pesten. Iedereen is gewoon gelijk aan elkaar."

"Aan de ene kant, het is wel erg voor die mensen want ze hebben geen huis, geen dak boven hun hoofd en dat soort dingen. Ze moeten gewoon vluchten omdat het niet veilig is. Ja.. aan de ene kant, Nederland wordt steeds voller en voller."

"Dan wordt het alleen maar voller en voller. En de bevolking van het land wordt er ook niet vrolijker van. (...) Dan hebben ze misschien het gevoel dat, zij hun land inpikken ofzo. In Nederland wonen er genoeg al allerlei soorten mensen, maar eh. Ik heb er op zich niet zoveel problemen mee."

"Ja, je zal maar zelf zeg maar in een land komen, vanuit Nederland bijvoorbeeld naar Syrië moeten. Je kent zeg maar niemand."

"Staat hier ook van, dat ze niet meer hand in hand. Als ik dat zou doen, en iemand zou roepen van lesbie lesbie!, dan zou ik ook denken van, ja laat die hand dan maar los. Maar dat is wel erg. Dat vind ik wel zielig."

"Ja ik vind het wel goed [homodiscriminatie oplossen]. Iedereen moet toch veilig over straat kunnen lopen".

"And if they have to go to the hospital, it's their own fault, isn't it? (...) They want to drink alcohol. Yes, they have to decide it with the parents."

"Hmm, I would be against making it [organ donation] obligated. But I think more people should hear how important it is. By commercials, that makes people more aware."

"En als ze dan in een ziekenhuis belanden, eigen schuld toch? (...) Ja hun willen alcohol drinken. (...) Ja met de ouders"

'Hmm, Ik denk dat ik daar [orgaandonatie verplichten] tegen zou zijn. Maar ik denk dat meer mensen gewoon moeten horen hoe belangrijk het is. Door middel van reclame, dat zie je al. Dan worden ze zich meer bewust."