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The Influence of Transactional Analysis on Open-Mindedness and Self-Perceived Creativity of Students in Higher Education

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ABSTRACT

The importance of developing 21st-century skills for students in higher education is widely recognized. Open-mindedness plays a significant role in creativity and communication, which are considered to be important 21st-century skills. In this research article, we explore whether transactional analysis can positively stimulate higher education students' open-mindedness. The study was conducted among students of two universities of applied sciences, one in the Netherlands and the other in Finland. The quantitative analyses showed a paradoxical effect. The creativeness score of the research group decreased whereas the creativeness score of the control group increased. However, analysis of the qualitative interviews showed that both Dutch and Finnish students reported the intervention created greater awareness of and insight into their own actions and group processes. It seems they developed a more realistic view of their performance, including their creativity, than they had before. The teachers confirmed this enhanced awareness and insight among their students.

KEYWORDS

Transactional analysis; open-mindedness; higher education; creativity; design-based education; 21st-century skills; qualitative research

Higher education faces the reality that, in the future, current occupations will change or even disappear. According to the World Economic Forum's "Future of Jobs Report" (2020), up to 50% of employees will need some degree of reskilling by 2025. Therefore, higher education students need to obtain skills that help them to be flexible and agile in an uncertain future and enable them to navigate unfamiliar contexts by themselves (Organisation for Economic Cooperation and Development, 2019). These skills, also referred to as "21st-century skills" or "future skills," are mostly general competencies such as autonomy, communication, self-efficacy, collaboration, creativity, and critical thinking (Ehlers & Kellermann, 2019; Thornhill-Miller et al., 2023). There is evidence that students with sufficient general competencies have better graduate employment prospects, and, because general competencies are transferable into new career paths, this also increases their chance of successful employment in the future (Lahdenperä et al., 2022). Research also shows that it is more efficient to learn general

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competencies together with subject content than in an isolated academic competence or study skills course (Schaeper, 2009; Tynjälä, 1999). Therefore, we integrated the transactional analysis (TA) intervention into the study program.

Current research emphasizes the importance of finding ways to support students in enhancing their 21st-century skills. Being open-minded is repeatedly mentioned as a key factor in developing creativity and critical thinking (Deo, 2025; Facione, 2011; Lai, 2011). Open-mindedness refers to being receptive to new experiences and ideas that are not your own. In addition to helping and stimulating students to learn new things and grow as a person, it can help them become more optimistic and resilient in the face of life's challenges (Cherry, 2022).

In this study, we explore whether transactional analysis can positively influence the open-mindedness of students in higher education.

Open-Mindedness

The definition of open-mindedness as being receptive to ideas and opinions that are new or different from your own (*Cambridge Dictionary*, n.d.; Cherry, 2022) is comparable to the personality trait "openness to experience" from the Big Five Inventory (BFI) (John & Srivastava, 1999). We chose this subscale because of its scientific validation and proven reliability. Although it has been argued that personality traits cannot change in the short term, some studies indicate it to be possible. The study of Allan et al. (2018) indicated that a 10-week coaching program can bring about a change in certain personality traits and that this change seems sustainable. Research conducted by Stieger et al. (2021) showed that daily use of a specially developed smartphone app can modify personality traits within 3 months and that change is still noticeable 3 months later.

In previous research, a connection between the personality trait "openness to experience" (John & Srivastava, 1999) and creativity (Chang et al., 2015; Prabhu et al., 2008) was identified. Furthermore, "openness to experience" also has the most empirical support in terms of being related to creativity (Feist, 1998; Prabhu et al., 2008).

A literature review investigating TA and open-mindedness was conducted using search string [All: "open-mind"] and [All: transactional analysis"] in the *Transactional Analysis Journal* and search string [ALL fields: "open-mind" AND "transactional analysis"] in the Scopus database. The journal search in 18 documents and the database search in 12 documents found that no previous studies were conducted on TA-based interventions specifically targeted to develop open-mindedness. Some studies, however, showed positive changes in other personality traits by using TA-based interventions. For example, Ciucur and Pîrvut's (2012) study showed a significant positive effect on the personality traits "emotional stability" and "social boldness" (Cattell's 16PF Inventory, 2004) among leaders and managers who had participated in a TA-based leadership training. In a study by Whitley-Hunter (2014), a positive correlation between TA and effective communication and between TA and managing diversity was shown. Students' "tolerance" for differences between patients also improved as a result of TA-based training.

Many of the characteristics attributed to open-minded people—such as asking questions and being curious, considering different viewpoints, listening to what other

people have to say, and believing that others have a right to share their beliefs and thoughts (Cherry, 2022)—are also characteristics deeply embedded in TA philosophy. They are directly connected to the core statements of TA such as "I'm OK, You're OK" and "Everyone can think" (Cornell et al., 2016). It is about really wanting to connect with the other person, considering the facts, and postponing judgment. Looking at these shared features and the outcomes of Ciucur and Pîrvut's (2012) and Whitley-Hunter's (2014) studies, we expected that a TA-based intervention was likely to have a positive effect on students' open-mindedness.

In this study, we report the results of implementing TA in some minors and modules at NHL Stenden University of Applied Sciences (NHL Stenden) in the Netherlands and at Häme University of Applied Sciences (HAMK) in Finland during the academic year 2022–2023. Minors are typically 5-month programs, and modules are typically 8-week programs. The research was conducted in two phases: from September 2022–January 2023 (phase 1) and from January–July 2023 (phase 2). We present here some exploratory results of our research. We first describe the research context and applied design; then present the results of the study; and finally discuss the results, describe the limitations of the research, and outline future research directions.

Research Context

Research Setting

The study was conducted at NHL Stenden in the Netherlands and at HAMK in Finland. These two universities were selected because they practice the same educational concept, that is, design-based education (DBE) (Geitz & de Geus, 2019; Lahdenperä & Jussila, 2023). DBE is a teaching and learning approach that empowers the learning process of all stakeholders in higher education: students, professionals from companies and other external organizations, and lecturers (Geitz et al., 2023). The DBE learning process involves learning by trying and doing and learning from experiences (Bakker & Sinia, 2019).

In DBE, students work in multidisciplinary teams on real-life assignments from regional companies, which are tackled in successive iterations to bridge the gap between a current situation and an intended situation (Geitz et al., 2023; Lahdenperä & Jussila, 2023).

Multidisciplinary teams consist of students from different educational programs with different areas of expertise. Students from other countries who participate in the programs add an international and intercultural aspect to the teamwork.

Not only is communication cited as an important (general) competence in every skills framework (e.g., Ehlers & Kellermann, 2019; Partnership for 21st Century Skills, 2008; Thornhill-Miller et al., 2023), but research by Lahdenperä et al. (2022) and Jussila et al. (2023) also showed that communication is a key factor for success in DBE challenges. Students mentioned the importance of being able to tune in to the client with your story and the importance of giving space for different perspectives within a multidisciplinary team. Both tuning in to your client and multidisciplinary teamwork appeal to students' communication skills, which made the DBE context ideally suited

to our research. Additionally, by choosing these two universities, bias caused by different educational approaches in learning was controlled.

DBE and Educational TA

Howell's (1982) conscious-competence model describes how students' competence develops in an unfamiliar learning context. When students start with a new minor/module, they are unconsciously incompetent. They do not know they are missing necessary information, skills, and so on to solve the problem or question that is presented. This turns into conscious incompetence as students realize they lack knowledge about the problem domain and which problems are worth solving from the stakeholders' perspective. As students progress through the project, they gain new information (by research, lectures, workshops, etc.) and start applying this newly gained knowledge to solve the problem (conscious competence), which in the end typically evolves into unconscious competence and tacit knowledge that can be applied in future projects and endeavors.

Barrow (2011) described how teachers can guide and support their students' competence development and how this support and guidance (ideally) shifts following the changes in the students' competencies. The first step is to make students aware of their incompetence (recognize) followed by reassuring them so they can endure this feeling of incompetence and have faith in becoming competent (reassure). When students integrate the provided knowledge and options and start generating ideas and building prototypes in their DBE project, the teacher's role changes to supporting the students in reviewing options and letting them experiment with those new options (enable) and, finally, helping students reflect on their learning process (reflect). Table 1 outlines the proposed connections between the levels of competency, the shifting role of the educator, and the phases in DBE.

TA Intervention

The aim of the TA intervention was to support students' developing competence in the DBE process. In this study, we specifically targeted the development from unconscious incompetence to conscious incompetence and on to the start of conscious competence (by handing them tools through the workshops).

Table 1. Howell's Levels of Competency, Barrow's Roles of the Educator, and the Phases of DBE.

Level of Competency (Howell, 1982)	Role of Educator (Barrow, 2011)	Phases DBE (Phases 1-6)
Unconscious Incompetence	Recognize	Companies present their challenge to the students
Conscious Incompetence	Reassure	Research an authentic world-of-work challenge (1) Determine the research question or problem statement based on knowledge and research (2)
Conscious Competence	Enable	Generate ideas (3) Build a prototype (4)
Unconscious Competence	Reflect	Apply the prototype (5) Research the impact (6)

The intervention consisted of two TA workshops of 2 hours each. The first workshop focused on collaboration, negotiating, and making agreements (contracting), whereas the second workshop dealt with challenges in communication and the underlying processes. Students had worked in groups before, but by giving them insight into the contracting and communication processes and making them aware of their role in them, we challenged them to reflect on their competence (recognize and reassure) while at the same time handing them tools to improve their contracting and communication skills so as to gain self-confidence (enable).

The first workshop started with a short introduction to TA and its core ideas. After that, the students learned what contracting is, why it is important, and what the requirements (Steiner, 1974) and the aspects of contracting are (Berne, 1966). Then students were introduced to the OK corral (Ernst, 1971), which deals with the different life positions. By connecting the OK corral to the process of contracting, students gained awareness of what negotiating from a certain frame of reference means. Students were instructed to ensure that every group member asked for what they needed. This was done to appeal to their own responsibility and to negotiate from an "I'm OK, You're OK" position.

The assignment in the contracting workshop was to make a group contract with their project group using the knowledge they had just obtained. Each group gave a short presentation about the process and the outcome and received feedback from the other groups. They then went for a second round to process the feedback. At the same time, students were challenged to carefully check that everyone had really indicated what they wanted to learn in this minor/module and had asked for what they needed from the group to achieve their goals.

The expectation of the contracting workshop was to create a good grounding so the second workshop would have more impact. Apart from the goal of improving collaboration and group work, this workshop also aimed to provide students with tools they could use in negotiations with their clients.

In the second workshop on managing communication, students learned about psychological games (Berne, 1964). By role-playing a situation from the game "Why Don't You, Yes But…" students became aware of these repeating (negative) communication patterns and felt the discomfort of not knowing how to handle situations such as those (conscious incompetence; Howell, 1982). This made them eager to learn about ego states and transactions (Berne, 1961; Solomon, 2003) and to understand the processes behind psychological games. By indicating the connection between the drama triangle (Karpman, 1968), the OK corral (Ernst, 1971), ego states, and transactions, students gained a better understanding of the communication process and how to influence it. After this, the game concept was reviewed to support students' understanding of the role of assertiveness in communication and the winner's triangle (Choy, 1990). Finally, students role-played the previous situation again but now tried to react from the related positions on the winner's triangle.

The objective of the second workshop was for students to look beyond a certain communication problem they faced and learn to postpone judgment of others by highlighting that there is often more to people's behavior than just being stubborn or difficult. It was expected that this would also broaden students' views of situations in general and help them to think more out of the box.

In the second phase of the research (January–July 2023), all of the teachers of the students involved in the study were trained in TA at the beginning of their minor/module. In a workshop, they were provided with the same information the students learned in their two workshops. We shared and discussed the choice of specific approaches, the hypothesis of our research, and the goals of the workshops with them.

By also training the teachers, we enabled them to better observe any changes in students' handling and understanding of situations compared to before the intervention. Teachers were asked not to use this knowledge of TA in their guidance and support but only to use it as input for their observations. This was to keep the measurement of the effect of the TA intervention as accurate as possible.

Research Design

In total, 288 students participated in this study, of which 85 completed both measurements.

From these 85 students, 46 participated in the TA workshops (the research group) and 39 did not (the control group). The research group consisted of 27 Dutch students and 19 Finnish students. Of the control group, 11 students were Dutch and 28 were Finnish. In this study we only report the results of these 85 students.

Participants

We conducted the study in several minors and modules at NHL Stenden and HAMK during the academic year 2022–2023. Participation in the TA workshops was voluntary. At the start of the minor or module, when the project groups were formed, the teachers asked the students which project groups would like to participate in the TA workshops (research group). To give students from the control group the opportunity to attend the TA workshops as well, we scheduled time for workshops with these students after the minors/modules ended. Table 2 shows the groups that were involved.

Design

We worked with the hypothesis that a TA-based intervention would have a positive effect on the open-mindedness of students. To explore this potential effect, we applied quantitative and qualitative measurements. Two measurement moments were taken for the quantitative measurements: at the start and at the end of a minor/module.

To sample experiences, seven Dutch and seven Finnish students, randomly chosen from all minors and modules and belonging to the research group, were selected for an interview at the end of their minor/module. All 12 teachers (three Dutch and nine Finnish) involved in the second phase were interviewed at the end of their minor/module. Table 3 illustrates the design of the study.

The first of the two workshops was scheduled during the first week of a minor/module. The second workshop was scheduled a few weeks after the first workshop. Ideally, at that time the students would have encountered some communication

Table 2. Overview of Research Structure and the Student Groups Involved.

Group*	Number of students involved	Research/ Control group	Period	Length	Baseline measure-ment	TA training teachers	Workshop 1	Workshop 2	Second measurement	Interviews students	Interviews teachers
1	24	13/11	September – November 2022	8 weeks	Week 0	--**	Week 1	Week 3	Week 7	Week 8/9	-- **
2	25	14/11	September 2022 – January 2023	5 months	Week 0	--**	Week 1	Week 10/11	Week 16	Week 18/19	--**
3	100	15/85	November 2022 – *Prematurely terminated*		Week 1 (at the kick-off meeting)	--**	Week 1	--	--	--	--
4	24	12/12	January – June 2023	5 months	Week 0	Week 1	Week 1	Week 10	Week 15	Week 16/17	Week 18/19
5	84	44/40	March – May 2023	8 weeks	Week 1 (at the kick-off meeting)	Week 1	Week 1	Week 4	Week 8	Week 8/9	Week 9/10
6	31	18/13	March – May 2023	8 weeks	Week 1 (at the kick-off meeting)	Week 1	Week 1	Week 4	Week 8	Week 8/9	Week 9/10
Total	**288**	**116/172**									

*1 = minor Sustainable Design Solutions, NHL Stenden.
2 = minor Future Design Playground 1st semester, NHL Stenden.
3 = Product Development Project, HAMK.
4 = minor Future Design Playground 2nd semester, NHL Stenden.
5 = Metrology Systems & Programming Applications, HAMK.
6 = Product Coordination & Product Design, HAMK.
**Teacher training and teacher interviews started after the first phase.

Table 3. Design of the Study.

Phase 1: September 2022 – January 2023	
At start module/minor	Measurement 1
During module/minor	TA intervention
At end module/minor	Measurement 2
After module/minor	Student interviews
Phase 2: January – July 2023	
At start module/minor	Training teachers Measurement 1
During module/minor	TA intervention
At end module/minor	Measurement 2
After module/minor	Student interviews Teacher interviews

difficulties in their project group or in communication with their client and would be eager to learn how to handle difficult communication situations.

The first author, a Certified Transactional Analyst and master of science in the educational field, also conducted the TA workshops and the interviews. Several measures were taken to ensure the objectivity of the study. Various experts from inside and outside the university were consulted. They contributed to the design of the study, the research method, the choice of measurement instruments, the interview questions, and the statistical analyses. Some of them also served as critical peers (Leuverink & Aarts, 2019) during the research.

Measurement Instruments

Openness to Experience BFI

To quantitatively measure open-mindedness, we chose to use the subscale "Openness to Experience" of the Big Five Inventory (BFI) of John and Srivastava (1999). This subscale consists of 10 statements about people's response to new experiences measured on a 1-5 Likert scale where 1 = Disagree Strongly and 5 = Agree Strongly.

We initially deliberately chose only one measurement instrument because it was an exploratory study, that is, an initial study to see whether there was any effect at all. We also did not want to overburden the students with too many questionnaires.

HowULearn Questionnaire

After evaluation of the results in group 1, we detected little change. Therefore, we decided to add questions from the subscale "General Working Life Competences" of the HowULearn Questionnaire (Parpala & Lindblom-Ylänne, 2012). These questions focus on learning experiences directly connected to the minor/module and were therefore only added to the measurements at the end of a minor/module. The subscale consists of six statements about students' development on collaboration and communication skills. It was added to the measurements from group 2 on.

Qualitative Interviews and Observational Data

For the qualitative measurements, we interviewed students from the different research groups. We also interviewed all teachers involved in the second phase of the research.

We decided to include observational data from the teachers when data from the first phase indicated that it was hard for students to recognize changes in themselves. The interviews were semi-structured, which gave participants the most freedom to elaborate on their experiences.

With the students, we discussed whether they could identify with the differences between the two measurements. We asked them what kind of change they experienced in themselves and how other people would be able to see the change. Furthermore, we asked them which TA concepts had had the largest effect and whether they felt they would have had different outcomes if they had not participated in the TA workshops.

We interviewed the teachers to gather their findings on any change in students' open-mindedness. We asked them whether they had observed possible changes in the way students collaborated and made collaboration agreements. We also asked them whether students approached each other, their teachers, and/or their clients differently and handled disagreements differently than before.

Procedure

The first phase of the research started in two minors at NHL Stenden in September 2022 and one module at HAMK in November 2022. In the second phase, one minor of NHL Stenden and two modules of HAMK participated. Table 2 gives an overview of the participating groups and students and an overview of the research structure.

We started with a baseline measurement in all groups before or at the kick-off meeting (before the project groups were formed). By choice, the students were divided into a research group and a control group.

In the first week, the students in the research groups were provided with the first TA workshop. Ideally, there should be a few weeks between the first and second workshops so that students have time to address any collaboration or communication issues that may have arisen within their group or with their client. Because in the 8-week programs there was limited time for this, the second workshop was scheduled in the third or fourth week of the program. In the 5-month programs, the second workshop took place in the tenth or eleventh week of the program. At the end of the minor or module, we conducted a second measurement and interviewed a total of 14 randomly selected students.

In the second phase of the study, the teachers involved at both universities were trained in TA at the beginning of their minor/module. We interviewed all of them (12 in total) after their minor or module was finished.

Unfortunately, we could not finish the research with the Finnish group from the first phase. Due to several circumstances, the study in this group had to be terminated prematurely.

Therefore, there are only baseline measurements available from this group. Table 2 gives an overview of the entire research structure.

Statistical Analysis

Multiple analyses were conducted. To summarize the individual items of the "Openness to Experience" subscale into a set of meaningful, uncorrelated components, we initially

performed an exploratory factor analysis using varimax (orthogonal) rotation. To analyze whether participating in the TA workshop was increasing students' openness to experience, a mixed ANOVA factorial design was performed in which the two measurements were the time variable and participating in a TA workshop (yes/no) the group factor.

Next, the added items regarding collaboration and communication skills of the HowULearn questionnaire were analyzed descriptively because these items were measured at one time point, that is, at the end of a minor. The analyses were performed in IBM SPSS Statistics (version 27) predictive analytics software.

With the data from the interviews, we explored the impact of the TA intervention in more detail. We conducted a thematic analysis to discover and interpret patterns and themes in the interviews.

Results

Subscale "Openness to Experience"

A total of 85 students completed both measurements of the "Openness to Experience" scale.

Table 4 shows the descriptive statistics of the means per item. We also computed per item the percentage of students who had responded with category four (agree) or category five (totally agree).

Before the start of their minor/module, students already valued themselves rather high (above 60%) on various items, except on the items "prefers work that is routine" and "has few artistic interests," where they scored much lower.

Exploratory Factor Analysis (EFA)

The original 10 items of the "Openness to Experience" scale could be summarized by three underlying factors (eigenvalues 3.97, 1.20, and 1.06, respectively) explaining 62% of the variance. We used the first measurements of all groups (sample size of 146) to determine these underlying factors. However, because factor 3 had only 1 item ("Prefers work that is routine"), we decided to retain two

Table 4. Pre- and Post-Test Descriptives for Subscale "Openness to Experience"

I see myself as someone who	Mean Before (SD) $N = 146$	Mean After (SD) $N = 108$	Percentage Agree Before
Is original, comes up with new ideas	3.88 (.94)	3.79 (.97)	75
Has an active imagination	4.05 (.93)	3.95 (.94)	79
Values artistic, aesthetic experiences	3.75 (1.06)	3.59 (1.01)	65
Is sophisticated in art, music or literature	3.32 (1.12)	3.29 (.99)	49
Is ingenious, a deep thinker	3.62 (1.07)	3.68 (.91)	62
Has few artistic interests	2.82 (1.18)	2.76 (1.06)	32
Likes to reflect, play with ideas	3.79 (.99)	3.74 (.96)	68
Prefers work that is routine	2.74 (1.24)	2.67 (.96)	30
Is curious about many different things	4.34 (.77)	4.09 (.89)	88
Is inventive	3.77 (.94)	3.56 (.87)	70

Table 5. Factor Components EFA of Subscale "Openness to Experience."

Items	Factor 1 Creativeness	Factor 2 Structuredness
Has an active imagination	**.795**	-.101
Is original, comes up with new ideas	**.748**	-.152
Likes to reflect, play with ideas	**.746**	-.189
Is inventive	**.712**	-.053
Is curious about many different things	**.683**	-.107
Values artistic, aesthetic experiences	**.682**	.304
Is ingenious, a deep thinker	.602	-.465
Is sophisticated in art, music, or literature	**.545**	.165
Prefers work that is routine	.172	**.731**
Has few artistic interests	-.182	**.550**

factors (see Table 5) explaining 51% of the variance. These two factors were applied to students who completed both measurements of the "Openness to Experience" scale.

The first factor we called "Creativeness" because it included items about how students considered themselves as imaginary, original, rich in ideas, reflective, playing with ideas, and sophisticated. The second factor we called "Structuredness," and it included two items: "Prefers work that is routine" and "Has few artistic interests." The item "I see myself as someone who is ingenious, a deep thinker" falls under both factors, so we decided to leave this item out.

Mixed ANOVA Analyses

By computing the mean of the items within both factors, we performed two mixed ANOVA analyses: the first with the factor "Creativeness" as dependent variable and the second with the factor "Structuredness." In both analyses, the between-factor was whether a student had participated in the TA workshops or not.

For the factor "Creativeness," we found a significant interaction between participation in TA workshops or not and the level of creativeness ($F(1,66) = 5.45$; $p < 0.02$). Students who participated in the TA workshops reported as less creative at the end of the minors, whereas the students who did not participate in the workshops reported as more creative. Figure 1 illustrates the change for both the research group and the control group. For the factor "Structuredness," no significant effects were found ($F(1,66) = 0,10$; $p = .75$).

Subscale "General Working Life Competences"

The added items from the HowULearn questionnaire (Parpala & Lindblom-Ylänne, 2012) provided us with more information on students' development during the minor/module in general. What is striking is that Dutch students scored significantly higher than Finnish students on almost every item. Both Dutch and Finnish students scored high on the items "I learned to see things from different points of view" and "I learned to make arguments for my thoughts." Figure 2 shows the scores for the Finnish and Dutch students.

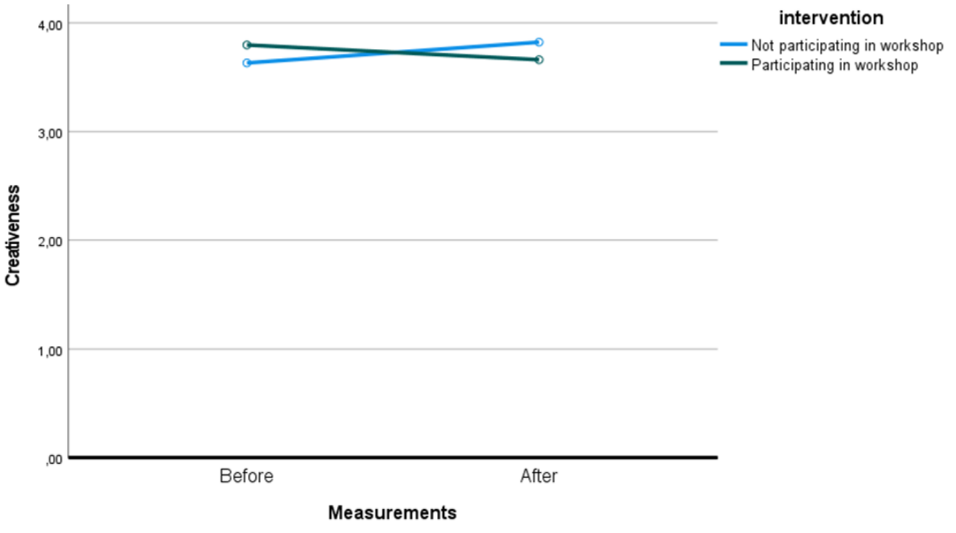
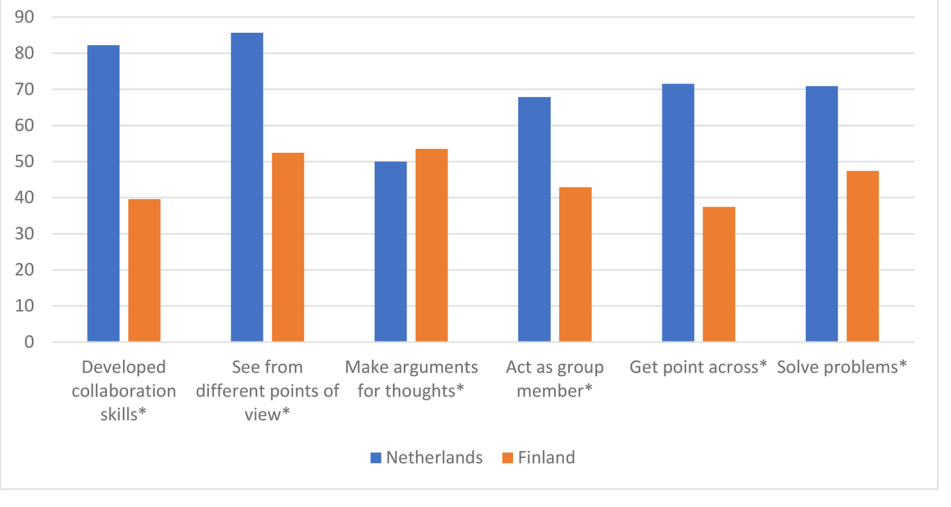


Figure 1. Effect of the TA Intervention on Creativeness.



* The minor developed my collaboration skills.
I learned to see things from different points of view.
I learned to make arguments for my thoughts.
Studying in the minor developed my skills in acting as a group member.
During the minor I learned how to get my point across in different interaction situations.
During the minor I learned to solve problems in practical situations.

Figure 2. Collaboration and Communication Skills of Dutch and Finnish Students.

Interviews

Student Interviews

Both Dutch and Finnish students indicated that the TA intervention created greater awareness and insight for them into their own actions and into group processes. It also made them more understanding of others and more open to the ideas and

opinions of others. One student admitted that previously he always liked to push his own opinions but that he is now more aware of this and listens more carefully to others' ideas. Another student told us that, looking back, he recognized that beforehand, he was sometimes quick to judge (You're not OK). He became more conscious of that and now he really listens to what others bring in. Yet another student acknowledged, "And when you take account of the other point of view, you sometimes realize that you yourself are wrong."

The students recognized the roles on the drama triangle (Karpman, 1968) in difficult communication situations and were more aware of the pull and danger of psychological games (Berne, 1964) or, as one put it, "How do I get away from that drama triangle?!" They also indicated that they now had the tools to handle such situations differently.

Several students indicated that the workshops broadened their view (helped them to think more out of the box) in other situations as well, but they found it difficult to distinguish the merit of the TA intervention from the minor/module as a whole. In particular, Finnish students indicated the time frame was too short to see if lasting change had taken place because such things require more time to take effect. They also suggested that we should expand the intervention because it takes more practice to master these kinds of things.

Students indicated that the TA workshops gave them insight. They recognized the patterns discussed in their day-to-day communication. It gave them tools for how to handle difficult communication situations, and they understood their own role in them. One of the students mentioned that the workshops gave him insight into the (group) dynamics in difficult communication situations because he could now see the different roles (of the drama triangle) from which people responded. He expected to be able to use this knowledge in other situations too. Another student mentioned that in his project group they had used the concepts from the workshops to better connect with a fellow student from Japan and to help him open up and share his thoughts and needs. The students developed from being (un)consciously incompetent to being consciously competent.

Teacher Interviews

Both Finnish and Dutch teachers indicated that it is difficult to determine what caused an observed change. A Dutch teacher stated that the change in mindset they saw in students was due to the totality of all things offered in the minor. The different components reinforced each other. However, the Dutch as well as the Finnish teachers thought the TA workshops made students more aware of what happens in communication processes.

One of the Finnish teachers noticed that the TA intervention helped students to be professionals. The students now understood what was happening and could consciously choose not to engage in a psychological game (Berne, 1964); they know how to deal with it. In the teacher's words, "Your workshop strengthened their view."

According to a Dutch teacher, what stood out among the Dutch students was that some of them mentioned their trouble with handling conflict situations. The TA workshops made them think, and they specifically included "handling conflicts

(communication)" as a learning objective for the minor. One of the Dutch teachers said, "They notice that they struggle with conflict and want to work on that." He added that one student specifically mentioned that the workshops were just the push she needed to take action.

Discussion and Conclusions

The aim of this study was to explore whether TA can positively contribute to the open-mindedness of students in higher education. Notable from the analyses of the pre- and post-creativeness scores is that students from the research groups had a lower score at the end of the minor/module than prior to it. Students from the control groups had a slightly higher post-creativeness score, as one would expect as a result of the offered education in general. It is our hypothesis that the TA intervention leads to a broader view and that this effect does not stop with communication but carries through to other areas, such as assessing one's own performance compared to others. The lower post-creativeness score from students in the research groups seems to suggest that these students gained a more realistic view of their own performance. The qualitative results seem to confirm the intervention had this effect.

The qualitative results show that TA training can boost students' self-confidence and self-efficacy as they gain insight into collaboration and communication and are given tools to resolve difficult situations in collaboration and communication themselves. TA supports their development from unconsciously incompetent students to consciously competent professionals.

In this study, teachers received TA training but were asked not to actively use their TA knowledge in order to keep the measurement of the effect of the TA intervention as accurate as possible. We believe that not only students will benefit from active use of TA in their guidance and support, but that it will also contribute to the well-being of teachers. When students are better able to resolve problems and conflicts in their collaboration themselves, teachers may experience less stress. If students are unable to resolve the issue on their own, the teacher can support them in the process from a TA basis, without being tempted to take on the role of Rescuer. Therefore, we recommend follow-up research in which not only students are trained in TA but teachers are as well (e.g., with a TA 101 course) with the goal of guiding and supporting students in their collaboration and communication development from a TA basis.

According to previous research by Kruger and Dunning (1999) and Kim et al. (2016), incompetent participants typically overestimate their performance whereas skilled participants underestimate their performance. This could be a (partial) explanation for our results as described in Figure 1. What we learned from this study is that TA helps students become aware of their incompetence and leads them to conscious competence in collaboration and communication. Based on repeated comments made in both student and teacher interviews, we recommend expanding the intervention to create more impact. In retrospect, we also recognize the importance of the first workshop in creating sufficient safety for students to participate in the second workshop.

The timing of the intervention in the academic year requires attention. In Finland, the intervention was planned at the end of the academic year, leaving students with no opportunity to continue practicing in subsequent modules the knowledge they had gained.

The timing of the intervention in the overall curriculum is another point of focus and should be carefully considered. Since (basic) skills such as communication, collaboration, and reflection are core components in DBE, it is important to pay sufficient attention to teaching and developing these skills right from the start. Students who start in higher education fresh from high school especially have a greater need to develop these skills. In DBE, communication and multidisciplinary work are crucial. From the qualitative research, we learned that students gained more insight into their own actions, became more considerate and open to other people's ideas and opinions, and also gained better insight into communication (problems). The research seems to indicate that TA can play a crucial part in developing the necessary skills. If implemented right from the start, students can better develop and improve their communication and collaboration skills and, equally important, can improve communication with their clients. It is expected that this will contribute to their sense of autonomy, self-confidence, and self-efficacy and, as a result, their well-being.

Concerning replication of this study, the authors believe it is possible to replicate it fully or partially. They think that replication of the second workshop, specifically, requires more in-depth study of TA and should only be carried out by a TA professional. And even though this study was conducted in a DBE context, the authors believe it is easily transferable to other educational contexts working with groups.

Limitations

A limitation of this research is that it was conducted in two universities of applied sciences, which limits the outcomes to higher education. And even though both universities base their teaching and learning on the same pedagogical approach (DBE) and have worked together in the Regional University Network (RUN-EU, n.d.) for 5 years, the influence of cultural differences cannot be ruled out. To conclude what the possible consequences for higher education in general might be, additional research at other universities would be necessary.

In total, 288 students participated in this study, but only 85 students completed both measurements, which is a large attrition. The high 70% nonresponse was partly due to the drop out of the Finnish group of 100 students in the first phase of the study. Also, completing the questionnaires was not mandatory because the research was not part of the official study program. The importance of the study and thus of completing the questionnaires was indicated to the students, but the choice was up to them.

For this study, we chose modules and minors within NHL Stenden and HAMK because in addition to sharing the same educational approach, these universities also collaborate and share ideas. In both universities, students can (partly) determine their own choice of minors and modules, so the numbers of participating students can vary greatly. When the participating minors/modules for the study were determined, it was not yet known how many students would eventually participate in the various

minors/modules. This explains the large initial difference between the number of Finnish and Dutch students. With the drop out of the Finnish group in the first phase, the numbers became more equal.

The influence of the Covid pandemic is also a possible limitation. The pandemic may have impacted the students' skills development, and that could have had an influence on the results.

Another possible limitation is the fact that in this study, the researcher was also the trainer. To avoid bias, experts from inside and outside the university were associated with the study from the beginning. They contributed and served as critical peers during the research.

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