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Use of AI Tools in Learning Platforms and the Role of Feedback for Learning

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ABSTRACT

Digitalisation and the pluralisation of life and work worlds offer flexibility, while at the same time demanding independence from young people in a working world increasingly characterised by uncertainty and complexity. For professional orientation and career development, self-initiative, self-knowledge and openness are required today. While the possibilities for career choice and development are pluralising, young people are thus faced with new challenges. As a support option, the EU project "Career 4.0" developed an IT and AI-supported learning platform that enables young people to master these requirements with the help of a digital mentoring concept. Together with partners from Bulgaria, Germany, Greece, Spain, Italy and Hungary, IT and AI tools as well as mentoring feedback were explored as aspects of career guidance and professional development. The results show significant differences regarding the importance and changeability of resistances as well as potentials around giving feedback.

Keywords: Entrepreneurship education, Constructive feedback, European learning platform, Agile learning, Artificial intelligence

STARTING POINT AND RESEARCH QUESTIONS

The digital transformation in the world of work has a profound impact on the processes of career guidance and the transition between school and work. The global spread of the Covid 19 virus in 2020/21 is making it even more difficult for young people to access education and work. Added to this are megatrends such as digitalisation, demographic change, and climate change, which lead to constant societal changes and place new competence requirements and skills on young people (Wagner et al. 2017; Kröll, 2019). At the same time, these changes require young people to orient themselves independently in today's world of work. While the options for career choice and further development are pluralising, young people are therefore confronted with new challenges.

Against this background, the question arises: How do young people succeed in orienting themselves in future working life in the context of these challenges? This is where the concept of the personal development plan comes in, which can be understood as a key instrument for competence management and career planning for young people. It is assumed that every young person has a personal development plan, which is rudimentary in the individual case. The aim of the learning platform "Career 4.0" is to reflect on and further develop this development plan based on an agile learning concept

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with mentors and experts. In doing so, it is important to ensure a certain level of quality of reflection in the corresponding reflection efforts. The quality of these reflection efforts depends, among other things, on the input on the basis of which the reflection takes place, as well as on the phases of the reflection process, their characteristics and design. The decisive factor is who gives the feedback in the context of the reflection process and when. In this case, experts or mentors with professional experience are used to ensure a certain level of reflection quality. The medium of the learning platform makes it possible to provide feedback promptly and independent of location.

At the same time, digital feedback for career orientation and development has hardly been researched. This gives rise to the research questions 1) how digital feedback can be used for career orientation and development, 2) to what extent IT-based feedback and learning processes differ from traditional forms of feedback and learning, and 3) to what extent they show effectiveness with regard to the career development of young people.

The role of different forms of feedback for learning, e.g., in the context of teaching, was explored in the scientific contest. Here, the central importance of feedback from mentors or experts has hardly been explored against the background of agile learning concepts based on IT- and AI-supported learning platforms (Narciss, 2013). Compared to other teaching-learning situations, the development of learning processes in the "Career 4.0" learning platform is open. This places special demands on mentors when it comes to assessing which forms of feedback prove particularly beneficial or less beneficial for the young people and how mentors can behave accordingly. This article addresses the research gap mentioned above.

THEORETICAL FRAMEWORK

Within the framework of the learning platform "Career 4.0", which enables the implementation of digital feedback and the collaboration of mentors and mentees, a learning concept was created consisting of four agile learning projects - talent diagnosis, employment radar, expert sharing and founder workshop - that the mentees can go through in the course of their learning process. The primary goal is to reflect on and further develop the personal development plan. The learning platform also supports the interaction and feedback process within the learning team and between learners or learning teams and mentors.

To examine effectiveness of feedback on professional orientation and development against this background, theoretical findings on the characteristics and effectiveness of feedback, the integration of digital IT-supported feedback components and the handling of feedback are presented below.

In general, feedback describes a conscious expression of opinion by a person, e.g. about past behaviour of another person (Müller and Ditton, 2014). Some considerations on the topic of feedback tie in with the understanding of feedback in the sense of theoretical approaches from cybernetics (Novikov, 2016), according to which feedback expresses a discrepancy between the actual and target state of a system. Building on this feedback that the actual and target state do not match and thus show a certain discrepancy,

measures can be developed and taken to achieve the target state or at least come closer to it. The reference to cybernetic approaches may be helpful as an illustration. It falls short against the background of scientific approaches to self-referential systems (Kröll, 2020).

Related to the context of the mentor-mentee relationship, feedback can be seen as support to get closer to the common goals of mentees and mentors. In contrast to the cybernetic understanding of feedback, these do not refer to closed rule systems, but to self-organised open processes. At the centre of self-organised learning processes is, among other things, the structuring and ordering of the learning process, whereby the learning goals, operations, strategies, control processes and their openness are organised by the learner himself (Greif and Kurz, 1996). In addition to this positive indication function of feedback on the degree of congruence between the actual and target state, feedback can also have negative consequences if certain rules and principles are not adhered to. Such destructive feedback differs from constructive feedback, which positively influences learning and performance (Steelman and Williams, 2019). This distinction does not refer to the form or content of the feedback, but to its effect. Thus, indifference, arrogance, lecturing, pejorative remarks are more likely to lead to tension, frustration and demotivation, which ultimately hinders or even completely prevents the learning process. The type of feedback and the way it is given are of great importance.

The starting point of the study is the meta-analysis of the research group around Hattie et al. (2007; 2016) The results of the research group indicate that in open learning situations, such as the further development of the young people's personal career plan, certain forms of feedback have significantly more positive effects on learning than others. Giving feedback also plays a central role in the concepts of employment radar, talent diagnosis, expert coaching and start-up workshops - albeit in different ways. According to Hattie et al (2016), effective feedback is about three questions: "Where do you want to go?", "How are you getting on?" and "Where do you want to go from here?". They therefore distinguish between the following forms of feedback: (1) task-related, (2) process-related, (3) self-regulating and (4) personal/self-related feedback. According to the evaluation of their meta-analysis, the second and third forms of feedback have the greatest effect on learning outcomes.

Benefits of feedback on recipients can be divided into three levels, following learning psychology: the (1) cognitive (aim: to close knowledge and competence gaps of the feedback recipient), (2) metacognitive (feedback supports the feedback recipient's self-assessment and self-perception) and (3) motivational level (London and McFarland, 2010) (Feedback can influence the recipient's motivation by confirming his or her achievements and abilities and giving him or her feelings of recognition and appreciation).

In order to work out the potential for improvement with regard to the concrete feedback given in the context of the learning platform, it proves beneficial to make the individual phases of the feedback process transparent with recourse to a process modelling approach and to model individual process steps. Against this background, the research project will also investigate

the extent to which IT and AI tool solutions (e.g., adaptive learning systems, learning analytics, intelligent CBR recommendation systems) can contribute to making learner feedback even more effective and efficient.

In the individual use of feedback, a distinction can be made between four phases, following Ilgen et al (1979): In the first place there is (1) the perception of the contents of the feedback or the understanding of the feedback, whereupon the feedback recipient more or less accepts the feedback. In this process, (2) the recipient's acceptance makes clear his conviction that the feedback relates to his demonstrated behaviour in an appropriate form. This acceptance can lead to (3) the feedback receiver wanting to respond to the feedback - in whatever form. Based on his goals, interests, motivation as well as his internal explanatory patterns, the feedback can trigger an intended reaction (4) in the feedback recipient, in that he acquires new competences and, if necessary, changes his behaviour (Ilgen, 1979).

How the feedback recipients (here: the young people) deal with the feedback ultimately also depends on their causal attribution, i.e. which reasons they see as causal for their progress or failure in action (Weiner, 1990). If, for example, they attribute their inadequate task performance to environmental factors, e.g. difficult and unfair tasks or disproportionate time pressure, or if they see the reasons in themselves, e.g. their lack of commitment or insufficient skills, this has different effects on the effects of feedback.

The outcome of a performance can be attributed either to the person or to the circumstances, i.e. internal or external. Furthermore, the causes of this outcome can be stable or variable over time (Weiner, 1990). For feedback to be followed by a change in behaviour, it must first be accepted and internally attributed by the receiver. The attribution of successes and failures must also take into account the fundamental attribution error and self-esteem biases.

Whether people accept feedback depends on numerous influencing factors that can be assigned to four areas: Characteristics of (1) the feedback message, (2) the feedback source, (3) the feedback recipient and (4) the feedback context (Smither et al. 2005). Empirical studies (Bono and Colbert, 2005; Jawahar, 2010). support the assumption that development-related feedback messages are more accepted than performance-related messages.

METHOD & EMPIRICAL RESULTS

Methodical Approach

During the scientific support of the "Career 4.0" project, a potential and resistance analysis was elaborated that uses a mixed-method approach. Firstly, a qualitative study was conducted in order to deduce items for a subsequent quantitative data collection by means of a questionnaire. Within the framework of the qualitative study, potentials and resistances were elaborated and systematised in international workshops in which more than 90 experts participated.

The questionnaire is divided into three blocks of questions: 1. assessment of potentials, 2. assessment of resistances and 3. information on country affiliation, experiences with learning platforms, role in the feedback process. The first block of questions focused on the question: In your view, which

potentials are significant that make giving feedback possible? To what extent is it possible to use these potentials to improve the efficiency and effectiveness of giving feedback. Starting point for the second block of questions were the following questions: Which resistances are significant that hinder or prevent giving feedback? Which resistances can best be changed or managed? The groups of people who participated in the quantitative study were: (1) people who fulfilled the role of mentor or expert in the EU countries, and (2) young people who worked on tasks together with the mentors and experts in the learning platform. The survey took place from December 2021 to February 2022. Over 100 people took part in the survey. Only 71 completed questionnaires were finally available.

In the first step, the participants in the survey were asked to rate the respective potentials and resistances according to how important they thought they were. This was asked with a 5-point Likert scale from 0 (not at all important) to 5 (very important). Multiple answers were possible in the quantitative survey. In the second step, they were asked to assess the extent to which they consider the potentials to be expandable and the resistances to be changeable. This was also surveyed using a 5-point Likert scale from 0 (not at all important) to 5 (very important). The questionnaire contains xx questions, including 58 closed and 2 open questions.

Since the present sample is limited, the empirical study does not claim to be generally valid or complete. Rather, it is a first approach to the problem of giving feedback in the context of a learning platform.

RESULTS

Regarding resistances, communication between mentees and mentors was explored in greater detail, examining the extent to which mentors and mentees "speak the same language,". It was also focused whether mentors may be patronizing, and the extent to which feedback is sufficiently formulated, constructive, and less judgmental. Furthermore, it was investigated whether mentors meet mentees at eye level and whether there is a relationship of trust between the two parties. In addition to aspects of communication, questions were asked about the extent to which mentees are motivated, whether generational problems exist, and how feedback is interpreted.

Importance of the resistances: With regard to the answers to the assessment of the importance of the resistances for the feedback processes, the study comes to the following results:

Mentees and mentors rate the following as the greatest resistances: "There is no relationship of trust between mentor and mentee" and "The mentees do not accept the mentors and their feedback to a sufficient degree." The least significant resistance is "Disputes within the team of young people hinder or prevent the acceptance of feedback".

Here, lack of trust is seen as more significant resistance by the mentees than by the mentors. In addition to the "lack of trust", mentees consider the "strongly evaluative feedback on the part of the mentors" and a "lack of empathy on the part of the mentors" to be the central resistances. The lack of

empathy on the part of the mentors proves to be a more significant resistance for the young people compared to the mentors' assessment.

From the mentors' point of view, on the other hand, one of the most important resistances, in addition to the lack of trust and the insufficient acceptance of the feedback, are the different degrees of motivation of the mentees. The mentees rate the last point less critically.

Conclusion: Almost all resistances are seen as a greater problem by the mentors than by the mentees. On the point of generational problems, the mentors also attribute greater importance to resistance. The opposite is true for the two resistances "lack of empathy on the part of the mentors" and "overly judgmental feedback". With regard to these points, the mentees rate problems higher than mentors.

Changeability of the resistances: The resistance most likely to be rated as changeable was the following: "The mentor's feedback is often too brief". It is interesting that this resistance plays a minor role in terms of importance compared to the other resistances. The following resistance is seen as the least changeable by the mentees and mentors: "The mentees' motivation to actively participate varies greatly, and so does their willingness to accept feedback." In terms of importance, this resistance takes a medium position.

To examine the mean values of the mentors and mentees, t-tests were conducted for independent samples. Here, the mean values of both groups differ for the item "Mentors patronise mentees." ($p = .033$, $M_{Mentors} = 3.50$; $M_{Mentees} = 2.77$) differ significantly from each other with regard to their changeability. The mean values of the item "The mentees do not accept the mentors and their feedback to a sufficient degree." ($p = .045$, $M_{Mentors} = 3.57$; $M_{Mentees} = 2.95$) were also significantly different with regard to their changeability. While the mentors rate the two mentioned resistances as definitely changeable, the mentees see this much more critically.

Approaches in dealing with the resistances: Based on this, measures for dealing with the obstacles mentioned can be worked out as an implication for practice, which can be observed as well as taken up by all affected and involved actors.

The responsible actors, such as the organisers in the individual EU countries, can at least make sure that the activities surrounding the use of the learning platform do not strain the trust between the young people and the mentors.

That the mentees lack knowledge to understand mentors' feedback is rated equally high by mentees and mentors. At the same time, the mentees see this point as particularly changeable. This is where CBR-based recommendation systems could come in. For example, the young people could indicate through appropriate answer options or (self-)tests that they lack certain knowledge to understand and accurately classify the mentor's feedback.

If the mentors consider these two points "Mentors patronise the mentees" and "The mentees do not accept the mentors and their feedback to a sufficient degree" to be significantly more changeable, then it may make more sense to communicate with the mentors in the first step or to qualify them. The goal of the corresponding efforts could be that the mentors learn to better recognise which behaviour triggers the impression in the mentees that they

are being patronised. It also seems to make more sense initially to clarify with the mentors how their behaviour can improve the acceptance of their feedback.

In the future qualification of mentors and experts, it could be taken into account that the "overly judgmental feedback on the part of the mentors" is rated as particularly problematic by the mentees. Within the framework of the qualification measures, the mentors could learn how to recognise and subsequently avoid "overly judgmental feedback" and which forms of feedback they give to the young people instead. In the process, certain formulation suggestions could be pointed out and explained to them in order to achieve this goal.

If it can be assumed that the resistance "Motivation of the mentees to actively participate varies greatly and thus also the willingness to accept feedback" can hardly be changed, then it would make sense to set up a query within the learning platform as to how pronounced the motivation of the individual young people is. If it is determined that the motivation of some young people is very low, then the mentor can initially only react to this without changing the motivation of the young people. This point could also be a content of the mentors' training.

In the area of "potential," we explored the role of communication in the feedback process, written feedback, the extent to which mentors' characteristics are important for the feedback process, and the role of the learning platform in giving feedback. In addition, the extent to which the implementation of giving feedback is considered to have potential in terms of the mentees' further development and everyday life was surveyed.

Assessment of the importance of the potentials: Based on the mentors' and mentees' assessment of the importance of the potentials for the feedback process, the evaluation concludes that the point "Those who have agreed to give feedback as mentors have a special motivation to help young people (mentees) in their future development" is seen as the most important potential.

In terms of importance, both mentees and mentors rate the two potentials "Learning platform enables feedback without much time and effort" and "Learning platform enables rapid feedback" equally. Overall, these potentials are also assigned a special role.

With regard to their importance, the mean values of the following two potentials differ significantly from each other: "The written feedback that mentors provide on the learning platform leads to more transparency with regard to feedback from mentors." ($p = .034$, $M_{Mentors} = 4.05$; $M_{Mentees} = 3.22$) and of the item "The young people can actively use the feedback from the mentors for their further development." ($p = .024$, $M_{Mentors} = 4.38$; $M_{Mentees} = 3.78$). The mentors rate the written feedback as more significant than the mentees as a potential with regard to giving feedback within the framework of the learning platform. Furthermore, the young people are more critical of the potential to use the mentors' feedback for further development.

From the mentors' point of view, the most important potentials are (1) their own motivation, (2) giving feedback faster and with less effort, and (3) asynchronous communication simplifies giving and receiving feedback. From

the mentees' point of view, the (1) feedback faster and with less effort, (2) the possibility of giving speedy feedback via the learning platform, as well as (3) motivating mentors with the help of the learning platform.

Assessment of the potential for development: The evaluation of all answers comes to the conclusion that the motivation of the mentors to give feedback with the help of the learning platform is improved and is classified in the most pronounced way as capable of development. A similar result emerges when the corresponding response behaviour is differentiated according to the group of mentors and that of the mentee. The potential "feedback benefits the further development of the young people" is named as particularly capable of development (in second place by all respondents).

Overall, mentees and mentors rate the use of the potential "to implement the feedback in everyday life" as the lowest in terms of expandability.

Use of the potentials: If the motivation of the mentors is a central potential, then the question arises as to which activities can be used to further expand the motivation of the mentors. In this context, it would also be necessary to examine whether a suitable qualification programme would increase the motivation of the mentors. In addition to specific qualification programmes for mentors, network exchange could be beneficial. The extent to which the establishment of an international mentor network and/or the elaboration of success stories positively influences the motivation of the mentors should be examined.

Based on the result that written feedback as a potential is not as important to the young people as it is to the mentors, the conclusion is that if the mentors offer written feedback to the young people via the learning platform, this will not be accepted by the young people to the desired extent. Against this background, it would be reasonable to assume that the young people prefer verbal and non-written feedback, e.g., via video conferences, to written feedback. Consequently, it would be obvious to offer correspondingly different interactive offers of giving feedback on the learning platform. In this respect, however, it would be useful to conduct further empirical studies.

OUTLOOK

The learning platform and the integrated IT-supported feedback function enable efficient and effective cooperation between mentors and mentees and, on the basis of this cooperation, offer support potential for the professional orientation and further development of the young adults. The article examines this connection empirically and also addresses potentials and resistances in the use and acceptance of IT-supported feedback. In the next project steps, it will be worked out to what extent these digital solutions can be further developed and expanded. In the further course, it will be examined whether the learning platform can be used beyond the vocational training of young adults for the operational context of human resource development, i.e. for organisational members. In this context, a perspective revision and expansion of the learning platform will also be discussed.

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