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| Report |
| The impact of research by TLT |
| Research group Teaching, Learning & Technology  1 november 2021 |

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# Summary

The research group Teaching, Learning & Technology investigates the didactic use of technology in learning processes. In doing so, it looks at themes such as flexibilisation, personalised learning, activating didactics and the effects of the use of technology in educational practice, particularly in higher vocational education. What had not been investigated so far was whether previously conducted research had a demonstrable impact on educational practice. This study is the first phase in providing insight into the impact of research carried out by the Teaching, Learning & Technology (TLT) research group of Inholland University of Applied Sciences. It looks at research carried out between 2010 and 2021. The objective is to describe how impact factors that can be influenced in previous research have been shaped. On the basis of this description, it may be possible to make recommendations to the research group with which the impact of the research it conducts in relation to these factors can be increased.

The research question is:

How do stakeholders describe the impact of research carried out by the research group Teaching, Learning & Technology in relation to the impact factors that can be influenced with regard to the research, the dissemination and the user value (experienced)?

In order to answer this research question, we used a convergent mixed methods design, in which a new conceptual model served as the basis for the analysis of data from the field research. Three types of data were collected, namely a qualitative document analysis (N=31), a survey (N=6) and semi-structured interviews with survey participants (N=4).

The study revealed that stakeholders mainly point to the researcher as the primary source of impact. Impact begins and ends with the researcher, especially in the extent to which he or she makes an effort to make the research relevant and in line with questions from the educational practice. We have listed a number of recommendations with regard to the way in which impact can be achieved in future research. These recommendations are mainly aimed at the way in which researchers of the research group can pay attention in a structured way to the design of the collaboration and to the concrete visualisation of expectations and intended impact at an early stage.

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# The impact of research by TLT

Colleges and universities often quantify research impact in terms of publications and products. The question is whether it is actually possible to measure impact this way when impact is defined as 'changes that are a direct or indirect consequence of scientific research' (Groothuijsen et al., 2017). This would mean that the publications and products must lead to impact. The question is whether this actually happens.

The research group Teaching, Learning & Technology (TLT) investigates the didactic use of technology in learning processes. The research group looks at themes such as flexibilisation, personalised learning, activating didactics and the effects of using technology (Lectorate Teaching, Learning & Technology Inholland, 2020). The main field of research is educational practice and in particular higher vocational education. Most research focuses on quality improvement and innovation of education within the Inholland University of Applied Sciences. At the same time, the research group uses insights gained elsewhere (e.g. in primary education) to prepare students of the bachelor of education (pabo) for their future work. What had not been investigated so far and what we were interested in in this research was whether the research done by the research group to date has had a demonstrable impact on educational practice. Below, we will discuss the objective, the research question and the relevance of the research. Then, in Chapter 2, we describe in a theoretical exploration how the conceptual model on which the research is based came about. We then describe the methodology and results, after which this report concludes by drawing conclusions and making recommendations based on these conclusions.

## Objective

To be able to say something about the impact of research done by TLT, it is necessary to look beyond the output of the research group in terms of dissemination activities and products. This research is the first phase in providing insight into the impact of research carried out by the research group. It therefore has the goal of using descriptions by stakeholders of the impact of research carried out by the research group Teaching, Learning & Technology to show how impact factors that can be influenced in earlier research have been shaped. On the basis of this description, it may be possible to make recommendations to the research group with which the impact of the research it carries out in relation to these factors can be increased.

## Question

The research question central to this study is:

*How do stakeholders describe the impact of research carried out by the research group Teaching, Learning & Technology in relation to the impact factors that can be influenced with regard to the research, the dissemination and the (experienced) usability?*

To describe the impact, we looked at the component 'impact' from the conceptual model (Figure 1), which is described based on the dimensions of scope, nature and progression of the impact. This was done in relation to research-related impact factors, dissemination and (experienced) usability. What we have not looked at in this set-up are the underlying mediating factors. These are relevant but cannot always be influenced directly by the actions of researchers. The following sub-questions were answered:

* Sub question 1: How can the research-related impact factors of research previously conducted by the research group be described in terms of relevance, intended impact and methodology?
* Sub question 2: How can the dissemination of research previously conducted by the research group be described in terms of communication, cooperation and training?
* Sub question 3: How can the (experienced) usability of research previously conducted by the research group be described in terms of the involvement of stakeholders and the usefulness of created products?
* Sub question 4: How do stakeholders describe the impact of research previously conducted by the research group in terms of its scope, nature and progression?

## Relevance

Measuring the impact of research has in the past often been done by looking at bibliometric data such as the number of citations to a research paper or article (e.g. Khazragui & Hudson, 2015). This research can contribute to the conceptualisation of impact in a broader context, by making room for qualitative information in addition to quantitative analysis. In addition, the research offers opportunities for further development and validation of previously applied tools and conceptual frameworks for describing impact.

Ultimately, society benefits from research that meets the needs of stakeholders. In addition, that research must be offered in such a form that stakeholders are able and motivated to accept new knowledge, so that it can lead to changes in thinking and acting. By gaining insight into the extent to which the research group currently seeks this connection and the impact that this has had as a result, and by issuing recommendations for possible improvements in this regard, the chair can in the future meet the needs of the educational practice even better, so that the impact of research by the research group is increased, which also improves educational practice.

# Theoretical exploration

The following definition of impact was used in this study: 'Any change in educational practice or educational science at any point in time, intended or unintended, as a result of the product or process of a practice-based educational research project' (Groothuijsen et al., 2020). Interpreting Reed (2016), this definition can be applied in more or less the same form to any form of research. He defines impact as 'the good that researchers can do for the world', mainly referring to positive changes as a direct or indirect result of research outside the academic context. Negative changes are not excluded, but they are usually not intended.

Achieving impact is one of the three core values of universities of applied sciences (VSNU, 2013). Nevertheless, achieving impact is not self-evident. Within universities of applied sciences, frameworks have been outlined for the valorisation of research and the impact which it must have on educational practice. This is sometimes referred to as the 'effect of research' (Franken et al. , 2017). According to Reed (2016), what is of great importance here is that a researcher already thinks about what impact the research should have when setting up the research, a so-called impact plan.

Broek & Nijssen (2009) describe that impact is influenced by the dissemination activities (communication, training, cooperation) undertaken in order to share results, the usability attached to them (the perceived usefulness of the research results and the involvement one feels with the research also play a role in this), the extent to which the results are ultimately used and the forms this takes (what Groothuijsen et al. call the nature of impact). What is not directly discussed in Broek and Nijssen's framework, but what is implied in the operationalisation of the usability phase, is relevance as an important factor. If this is experienced to a lesser extent, one can speak of a relevance gap (e.g. Mesny & Mailhot, 2012); a discrepancy between the relevance experienced by science and (educational) practice. This has negative consequences for impact.

Possibly also influencing the creation of impact (both during and after completion of research) are personal factors. Zielhuis-Van den Heuvel (2018) and Meulendijks (2018) state that factors such as motivation, sense of ownership, influence and available resources play a role in whether or not impact occurs.

## Impact factors

The aforementioned conceptual models reveal a number of factors that play a role in achieving impact. We will further operationalise these factors, making a distinction between two types of impact factors. Firstly, impact factors that can be influenced directly by the researcher, often external, which can be placed in different phases of the research process. We distinguish between four concepts: research aspects as impact factors, dissemination as impact factor, (experienced) usability as impact factors and, of course, the impact itself. In addition, we describe the indirectly influenceable, more internal impact factors. These are important in the conceptual framework when it comes to describing impact. However, these internal impact factors have not been examined further in this study.

### Research aspects as impact factor

Earlier, we described some factors that can be directly related to the research itself, such as the relevance of the research and the link to educational practice. Co-creation and thus the interplay between researchers and stakeholders are important (Bensing, 2006; Dagenais et al., 2012; Franken et al., 2017). This already establishes a relationship with cooperation and communication with stakeholders, which we will explain later as factors. Furthermore, we can state that the applied research methodology plays a role in the extent to which impact can be achieved. A design which provides for close involvement of stakeholders in the formulation of the problem definition, research question and in the execution of the research method - think, for example, of action-oriented or design-oriented research - is expected to achieve a greater impact than a design which relies more on the researcher, such as desk research.

Directly influenceable impact factors at the research level are:

1. The described relevance (both to practice and science),
2. the methodology (including the objective, research type, but also target group and degree of cooperation with stakeholders)
3. and the intended impact and planning towards it.

### Dissemination as impact factor

In the communication with stakeholders prior to the research, impact can already take place on a conceptual level, as the thinking and thus also potentially the actions of those involved can be influenced (Franken et al., 2017). Also during and after the research process, dissemination can contribute to the impact of the research. It is also important that the products or forms used for this purpose fit in well with the needs, expertise and contexts of the target group (Dagenais et al., 2012). Collaboration, as described earlier, is also a form of dissemination that is relevant and measurable (Broek & Nijssen, 2009). Finally, education in the form of, for example, workshops, lectures and training courses is also a form of dissemination.

When it comes to operationalising the dissemination factor, we look at

1. the communication before, during and after the study,
2. the cooperation with the field of work and the way it is organised
3. and valorisation of research results in the form of training.

### The (experienced) usability as impact factor

The 'adaptation' of research results to fit the target group in terms of dissemination can be seen as a logical step towards the creation of usability. In turn, usability is a condition for the utilisation of these products (Broek & Nijssen, 2009). Broek & Nijssen distinguish two underlying indicators here. Firstly, the extent to which stakeholders experience involvement or have been involved in the research. They also look at the usefulness of the research results, which they describe in terms of the extent to which there is the creation of a usable/deployable product based on the results of the research.

Experienced user value as an impact factor can thus be described in terms of

1. the involvement of stakeholders
2. and the extent to which there is a usable product that has emerged directly from an adaptation of the research results (Broek & Nijssen, 2009).

### Impact

The resulting impact, which can follow from a combination of actions during and after the conduct of research, can be expressed in three dimensions: the scope, nature and progression of impact (Groothuijsen et al., 2020).

By scope, we mean the size of the target group to be reached, but also, for example, whether this target group is only within the context of the research/school or also outside it.

The nature of impact is described within this framework based on research by Dagenais et al. who speak of three overarching forms of impact;

1. conceptual change, a change in thinking,
2. instrumental change, a change in action and decision-making and
3. strategic change, where there is actually no visible change, but where new/changed insights are used to underpin existing actions (Dagenais et al., 2012).

Broek and Nijssen call this 'utilisation' in their model (Broek & Nijssen, 2009).

Progression concerns the factor of time, within which we can again make a distinction between the sustainability of the change, the timeframe within which change takes place and the stability of the change over a period of time. What is taken into account, however, is that recent research in particular has not by definition already had an impact, as it can sometimes take years before impact is visible (Bornmann, 2012). In addition, it is important that the relationship between the research and the impact described is present (Reed, 2016).

### Indirectly influenceable (internal) impact factors

During the entire process of research, via dissemination, the creation of usability to impact, factors that cannot be (directly) influenced by researchers also play a role. We call these impact factors that can be influenced indirectly.

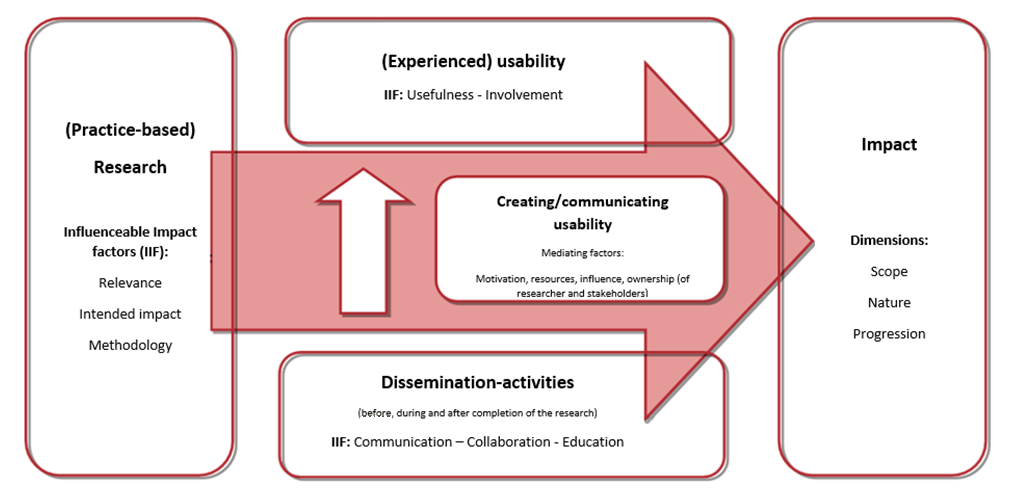
For example, the motivation to use research, but also that of the researcher to disseminate results are factors that can play a role (Rymer, 2011; Zielhuis-Van den Heuvel, 2018). There are various theories related to motivation in relation to the context of education. This usually concerns the motivation to learn. A definition of motivation that results from a synthesis of these different theories is 'The energy and drive to learn, to work effectively, and to reach one's potential by exhibiting behaviour that follows from this energy and drive' (Martin, 2003). In order to identify motivation as a whole, we need to look at the reasons for acting, how someone acts, the self-confidence with which someone acts, the capacity of the learner to overcome obstacles and also to cope with setbacks (Martin, 2003). By considering a research stakeholder as a learner in the context of research outputs and the impact on educational practice, instruments developed to measure learner motivation (e.g. Martin, 2003; Stover et al., 2012) may also be used in an adapted form to assess stakeholders' motivation to receive (disseminate), use and utilise research in practice.

The researcher's motivation probably comes from a different source. There has been limited research on the influence of researcher motivation in achieving impact. Jeong and Choi (2015) describe internal factors in research collaborations as 'the black box' of collaborative research. Again, we can possibly draw a parallel with motivation in another context. For example, Cnaan and Goldberg-Glen (1991), in a study of motivation to participate in volunteer work activities, state that recognition may be a factor. Jeong and Choi specifically mention increasing chances for promotion and the existence of reward structures within their organisation as important extrinsic sources of motivation.

In addition to motivation as a potentially important impact factor that can be indirectly influenced, research by Zielhuis-Van den Heuvel (2018) showed that more practical matters that usually lie outside the researcher's sphere of influence also play a role. These include available resources such as time, money and other practical matters that are necessary for the valorisation of research (such as, perhaps, the ability to write reports and articles). The amount of influence someone has to create impact within a certain context or the sense of ownership one experiences can also contribute to translating research results into impact. In the conceptual model described below, the factors motivation, resources, influence and ownership are described as mediating factors.

## The conceptual model 'Factors influencing impact

Insights from different theoretical perspectives give rise to a synthesis in the form of the conceptual model shown in Figure 1. The model is built around the conceptual model of Broek and Nijssen (2009) and largely derives the description of phases between research and impact from it. In order to make room for factors in the research itself that can contribute to impact, we added a column 'research' to the model, which includes the research aspects that can be influenced, as described earlier. Where Broek and Nijssen (2009) l speak in general terms of impact on a social, economic, cultural and democratic level in their model, in this study we mainly look at the impact within and outside the context of (practice-based) research in terms of the dimensions of scope, nature and progression of this impact.



*Figure 1.* Conceptual model 'Factors of influence on achieving impact', based on (Broek & Nijssen, 2009; Franken et al., 2017; Groothuijsen et al., 2020)

# Method

A convergent mixed methods design was used to answer the research questions (Creswell, 2014). The research group has a publicly available overview of previously conducted research on its website. From these documents, we made a selection based on the criterion that the document described a clearly identifiable group or groups of stakeholders. The selection consisted of 31 documents, consisting of published articles, research reports and theses from students of the master programme Learning and Innovation (MLI) in which members of the research group played a supervisory role. Stakeholders who were involved in the selected studies and whose contact details were available were invited to participate in a survey. Of the 32 available contacts, 4 turned out to be no longer correct, which meant that 28 participants were eventually approached. In total, the survey was completed by 6 participants (N=6). This is a participation rate of 21.4%.

In the survey, we also asked whether participants wanted to participate in an additional semi-structured interview. Four participants responded positively. They were all approached and subsequently interviewed.

## Materials

Figure 1 shows which factors and underlying measurable indicators are included in the description of the impact of research carried out by the TLT research group. These factors and indicators served as a basis for a code list that we used in the document analysis and for the survey.

For the survey, an adapted version of the measuring instrument that was previously used in research into the impact of research carried out by students of educational sciences (Meulendijks, 2018) was used. Adjustments were made to emphasise the indicators described earlier. The semi-structured interviews were conducted on the basis of the toolkit 'Narrative of Value Creation' (Wenger, Trayner, & De Laat, 2011), supplemented where necessary with questions arising from the document analysis and analysis of the survey data.

## Data analysis

All documents collected and selected (N=31) from the TLT research group website were deductively descriptively coded in MaxQDA using the prepared code list. The results of the quantitative items from the survey were added to a dataset in IBM SPSS Statistics 24 (IBM, 2017) for the purpose of performing descriptive statistics. Due to the limited size of the dataset (N=6), it was also possible to use the overviews from Microsoft Forms, where a visual interpretation of data was sufficient. Qualitative items from the survey were included in the MaxQDA dataset for qualitative coding using the code list. Interviews conducted, if recorded, were added to the MaxQDA dataset as a video/audio file, where they were transcribed and coded.

By triangulating these three data sources using a code list, we were able to create a complete overview of the complex phenomenon of impact. From this overview, we were able to draw conclusions with regard to the research question and sub-questions and subsequently give recommendations based on this description and the literature.

# Results

## Relevance

The relevance described in the theses is mainly practical. For example, a participant described: "Look, it's nice when you write a research paper, I did it for my Master's, of course, but it's nice when you come up with something that actually has impact and is actually a solution to a problem and that other people get to work with it, because ultimately if you do, yes, you know, it's a bit of a waste if you put so much time into it."

The research initiated by TLT also focuses on topics that are relevant to practice. Where the theses give a picture in which the students describe this relevance from the perspective of a problem experienced by themselves or their colleagues, several reports of the research group mention the involvement of partners in educational practice in determining the relevance.

A comparison between these descriptions and the data from the survey confirms the image of a practice-relevant objective. When asked about the relevance at the time of implementation and at this moment, the relevance at the time of implementation was high. In some cases, however, it decreased over time. Circumstances that influenced this, according to participants, were for example the reform of the curriculum, in which research results were not included, or the fact that there was no demand (anymore) for the developed product after completion of the research. The research is considered relevant especially for the context studied and the researcher himself. The relevance to science is described in varying degrees. An example of high scientific relevance was research into the use of video in education.

In several interviews, it became clear that the research is no longer directly relevant to developments at the moment in that form, but that the participants still actively use the knowledge and skills they acquired during the research process. It is sometimes difficult to demonstrate that impact can be directly linked to the research.

## Intended impact

The primary objective and by extension the intended impact are described differently in the survey, despite the similar approach in terms of practical relevance. This varies from contributing to scientific knowledge to increasing one's own knowledge and developing a product. Solving a practical problem was also mentioned a few times, but was not the participant's primary objective in all cases.

## Research design

In the documents analysed, it is mainly the higher vocational education sector that emerges as the target group. The theses describe a target group that is close to the student. These are lecturers at universities of applied sciences or, in a few cases, teachers in other educational sectors, such as primary education. The survey response shows a similar distribution.

When it comes to the type of research, all the papers analysed describe qualitative research. The theses are often design-oriented. In addition to design-oriented research, the articles and research reports of TLT also describe other forms of research.

The way in which the research hoped to be relevant differs, especially in the research carried out by the research group. This is particularly the case in the translation to practice. Whereas the theses usually take a very practical approach in the form of a design that is set up by (one of) the stakeholders themselves, the results of TLT research carried out in consultation with stakeholders in the field seem to take the form of evaluation reports, advice and descriptions that may be useful for practice but that are not necessarily experienced as such by partners in the field.

## Dissemination

All the documents analysed were obtained from the TLT research group website, where they were freely available for download. Most of the documents available there were written in Dutch. This was mentioned by a participant in the interview as a possible point for improvement. The indicators communication, collaboration and training will be described successively below.

## Communication

The theses mention that a presentation to stakeholders within the own organisation is a mandatory part of the conclusion of the process, in which the supervisor (from TLT) is also present. Various activities are also undertaken during the research to communicate about the research. The survey shows that the more informal forms of communication towards practitioners are particularly preferred during and after the research. Dissemination in the direction of a more scientific audience in the form of an article in a scientific journal was done by only a few people. Inspiration is also mentioned as a form of more informal communication.

## Collaboration

Collaboration, is a commonly recurring theme in the interviews. The involvement of colleagues in the same department, at the same location or beyond is regularly mentioned. The word 'sounding board' is also mentioned, whereby the researcher involved refers to verifying insights into the needs of the target group with a colleague who is also involved. The role of management was also emphasised in the interviews as being essential for achieving impact. The extent to which people are 'positioned' to achieve impact, for example by allocating resources such as time and money, regularly came up as an important (mediating) factor in achieving impact.

In the interviews with various former MLI students who went through this process, they looked back with praise at the guidance they received: "I've really been super happy with the guidance...I've experienced it as super valuable and inspiring...It's nice that they shared the expertise they had and I had the space to get to work with those insights and those models." In the research reports and articles written by the research group, it is noticeable that in the recommendations it is regularly suggested to partners in educational practice to collaborate with colleagues, but also with students. In the research design itself, collaboration in the relation researcher-participant is described much more often. In an interview with someone from the field of primary education, an important point of criticism emerged that, in this study at least, we had not made optimal use of the opportunities for collaboration that existed: "I hoped that participating in this study would pave the way to using iPads based on learning objectives instead of free apps. The research has given me insights that I can use, but has not paved the way because the participating teachers did not appreciate the way the research was done...An important aspect of collaboration is also being interested in what is happening. Questions and projects in our daily practice were not topics of discussion during meetings. So don't just take, but also want to actively bring/contribute."

## Training

The theme of training overlaps to some extent with the previously described communication and collaboration. It is also striking that in the recommendations of the master's theses in particular, training is mentioned as a way to further disseminate research results. Here, the relationship with topicality and relevance should also be made: "Look, if you look at the development of training specifically for my field of research, that did not take off. That has to do with the fact that at the moment we were able to make progress in that area, the planned courses did not start, because there were too few enrolments... You don't build something, at least not me, if you don't need it." The importance of the need for training is described here. This was linked earlier to the opportunities that are offered to shape training. A participant mentioned this in an interview as the 'rigidity' of the organisation in some areas. Even when opportunities are offered, things are not changed just like that. In another interview, as an example of this, it was mentioned that not everyone can/will develop at the same pace: "It is Rogers' classic 'adoption curve' (e.g. Orr, 2003; Rogers et al., 2019)...Some people jump on the band wagon right away, some follow later and others you don't get to come along at all...". The role of motivation and willingness to change is also reflected here.

## Involvement

The previous description already shows that involvement seems to be strongly related to the degree of collaboration between different (groups of) stakeholders. In the studies we conducted, we repeatedly emphasise the importance of stakeholder involvement in the research process (e.g. Bottema et al. , 2017; Goozen et al. , 2012). Half of the survey participants state that there was a continuous interaction between stakeholders from the field and the researcher(s) involved. In the other half of the cases, there was consultation about the problem and question, but the involvement of others did not go any further than that.

In almost all cases, involvement concerns the involvement of stakeholders within the context of the research. Here again, the previously described informal knowledge sharing is experienced as valuable. The more formal channels are used relatively little. In general, people indicated that there was limited interest from the scientific community. At the same time, it had already been established that there had been fairly limited dissemination in the direction of science. The extent of possible involvement from a broader (scientific) context is therefore questionable, as this was generally not the case. When it comes to the availability of materials, the earlier comment from the interviews comes up that when publications were made for a scientific target group, the potential scope was limited by publishing in the Dutch language only.

## Usability

As stated earlier, a variety of qualitative research methods have been applied for the purpose of different types of research. In the document analysis, it is noticeable that the theme of 'usability' is mainly described in design-oriented research. "If it is not usable, it cannot be effective" (Groenen, 2014 p. 87). What makes something usable is explained in varying ways, also because this partly depends on the intended objective. However, 'ease of use', for example, is mentioned as an element of usability (Sutherland, 2015).

A link that is made in one of the theses is that between usability and the willingness of stakeholders outside the immediate research context to go along with proposed developments. It is said: "The number of secondary schools that have gone along with these developments has, however, been very limited. From this, it can be concluded that expectations regarding usability must be modest" (Groenen, 2014 p. 87). Here, the responsibility of Inholland as an organisation is also mentioned: "The Inholland teacher education department has not consistently invested in building a network of schools that are interested in the approach and that are willing to initiate activities or developments that fit in with cross-curricular education." This suggests a link between dissemination, relevance and usability. It is not immediately clear whether this has been acted upon.

When it comes to usable knowledge for science, four of the six participants in the survey stated that this was not the case, or only to a limited extent, which is in line with the earlier observation that MLI students in particular put little effort into valorisation at the scientific level. The survey also asked which factor they thought had contributed most to the usefulness of the results for educational practice. The relevance of the subject was mentioned again, along with the factor of translating results into a product that could be used immediately. Here, the participants made a distinction between usable knowledge on the one hand and immediately usable products on the other.

# Impact

Up to now, we have mainly looked at the impact factors that can be directly influenced with regard to the research design, the dissemination and the user value of the research results. We have also looked at the impact itself, whereby the dimensions of scope, nature and progression will be elaborated successively in order to eventually arrive at an overview of the realised impact. In the survey, impact was rated on a scale of 1 to 10 with an average score of 5.5 (M=5.5, SD=2.51). The lowest score given (1) was linked to the aforementioned research that was not included in the adapted curriculum. The highest mark (8) was linked to research that was also widely disseminated and that also led to follow-up research.

The explanation of the intermediate ratings depends on the participants' interpretation of the word 'impact'. This interpretation appeared to differ from time to time. This was partly because they sometimes doubted whether changes in educational practice could be attributed to the research results of that research. In one case, the impact was rated relatively high (7) because it had a major impact on the student's own knowledge and its effect on his/her daily educational practice. In another case, the impact was felt by a larger group of people as a result of research results being put to use in the form of a learning network, but the impact was rated lower (5) because the impact realised differed from the impact initially intended.

## The scope of the realised impact

The document analysis shows that the scope of the intended impact is usually limited to a single organisation, domain or programme. When a programme is facilitated at several locations, these locations are usually all involved in the research. The number of participants in the research varies from a few (usually teachers/pioneers) to larger groups of students and teachers. The smallest participant group described consisted of 2 teachers. The largest consisted of 218 students. As participants in the described research, they could potentially experience impact just by participating. It is striking that the participants of the survey in this research mention the teachers/teachers as the main target group for the research, while the reports and interviews show that the scope of the realised impact is not limited to only the previously targeted teachers. So, while the impact has a relatively small described scope (according to five surveys an average of 10 teachers), the scope may be much larger.

## The nature of the realised impact

The intended nature of the impact (conceptual, instrumental or strategic) seems to have a direct influence on the choice of research design. The document analysis shows, among other things, that design-oriented research tends to pursue instrumental and/or conceptual impact, which is to be expected given the practice-oriented nature of design-oriented research. Evaluative research tends to aim for a conceptual and sometimes strategic impact. In exploratory research, a clear impact is not necessarily defined in terms of the nature of the impact. The objective there is mainly aimed at gaining knowledge about a subject or context.

This picture is also reflected in the results of the survey, which was only completed by MLI students and partners ineducational practice. Two of the six participants indicated that they mainly pursued conceptual changes. Four of the six stated that they were concerned with instrumental changes in educational practice.

## The progression of the realised impact

The studies looked at in this research ranged in age from 11 to 1 year old, with the vast majority (N=28) being no older than seven years. This offered the prospect of gaining insight into the progression of impact over a longer period of time. The survey responses show a mixed picture of the sustainability, timeline and stability of the impact. The question was asked how sustainable the impact was. Four of the six participants stated that the impact was sustainable and that the impact would last as long as it was maintained/secured. Two of the six participants stated that the impact was somewhat sustainable and only lasted for a short time. This picture is also confirmed in the interviews in the sense that they also mention that the results of the research themselves do not have any impact now, except to the extent that the researcher still acts on the basis of the knowledge acquired (i.e. in the form of an impact on his own knowledge/skills).

Another question asked was whether participants could give an insight into who was influenced by the research results at what point in time. A fairly clear picture emerges at the start and during the research. At the start, the impact is mainly on those involved in the implementation and the target group and context of the research. During the course of the study, this shifts to, in particular, the target group and the context of the study. After completion of the research, the picture again varies widely, from 'There is mainly impact on the people involved in the implementation' to 'There is impact on several groups within and outside the context of the research'.

What is striking is that half of the participants state that there is no visible impact at the moment. The interviews that were subsequently conducted with the majority of the participants, however, show that an impact may be visible at the moment, but that it cannot be proven to be related to the research results, or that the impact is not directly derived from the research results, but is created indirectly, for example, in the form of inspiration from others.

# Conclusions and discussion

The objective of this study was to use stakeholder descriptions of the impact of research carried out by the Teaching, Learning & Technology chair to show how impact factors that can be influenced were shaped in earlier research. The research question formulated to this end was: How do stakeholders describe the impact of research carried out by the research group Teaching, learning & technology in relation to the impact factors that can be influenced concerning the research, the dissemination and the (experienced) usability?

The results of the document analysis, survey and interviews clearly show that research had to be relevant to educational practice. The researcher has an important role in this, as he or she makes the choices regarding the objective, the research question, the research method and so on. A striking dichotomy becomes immediately apparent when the MLI master's theses are compared with research conducted by ourselves. In the case of the theses, the research is directed by the student, usually a lecturer at the university. The choices subsequently made in setting up the research make it directly relevant to the student's own educational practice in particular. The research that follows has a limited scope, often taking the form of a (re)design (instrumental and/or conceptual impact), aimed at improving educational practice by making adjustments, in consultation with immediate colleagues, based on an experienced problem. These improvements are given concrete form and, as far as possible, implemented within the constraints of the organisation and circumstances within which the research was carried out.

Research that is conducted/initiated by us has a greater variety of objectives and corresponding qualitative methodology. The objective is usually also to improve educational practice. The results of these studies are considered relevant by stakeholders in the field of education. A difference between these studies and the studies in theses is that the step from result to useful product is not always taken. Even when the field indicates that there is a need, this is not always satisfied within the framework of the research at that time.

This research shows that the researcher plays an important role in several parts of the conceptual model. The dissemination of research results in different forms seems to be an important factor in the progression and sustainability of impact. Especially outside the original context of the research. There is limited investment in this in thesis research, which may be a missed opportunity.

Another important role the researcher plays when it comes to dissemination is that of partner in the collaboration. As soon as the bond with educational practice is greater (as, for example, in thesis research), this seems to be a fairly natural part of the research process. When the connection is less direct, as when we conduct research in an external context, it does not seem obvious that the collaboration takes the form of that between equal partners. In the examples described earlier, there was more of a one-sided researcher-participant relationship, which may result in missed opportunities in translating research results into products that can be used by all parties involved.

The researcher also has an important role to play in the (collaborative) creation of usability. Researchers of the research group are described as skilled supervisors and implementers of research and seen as experts when they carry out research in an external context or supervise students or work field partners.

It can be concluded that impact begins and possibly ends with the researcher. In particular, in the extent to which the researcher makes an effort to make the research relevant and in line with the questions from the educational practice, in order to subsequently arrive, in collaboration, at research results that are made usable and disseminated within and outside the context of the research through both formal and more informal channels.

What that impact looks like in terms of scope, nature and progression depends on various factors. Looking at the results, it can be said that the scope is usually limited to a single educational environment, such as a programme or part of a programme, with the teachers/lecturers being the target group that is worked with and who also play a role in the implementation of changes. Indirectly, the stakeholder group is larger, as students and pupils also experience impact on the curriculum. However, this target group is usually not mentioned in the documents or survey, but it is in the interviews. The nature of the impact is mainly instrumental and/or conceptual. Progression seems to depend strongly on factors described earlier, but in the results it is directly related to the extent to which researchers are given the opportunity to shape usable products.

One theme that frequently came up in the interviews was that of 'positioning'. Almost all the participants talked about the importance of support from management in order to shape and implement changes. The facilitation of this in terms of time and money was also discussed. These matters had already been mentioned in the conceptual model as mediating factors of influence. Ownership, motivation and influence also come to the fore. Several participants indicated that they were given the opportunity to further develop initiatives that followed from the research. As a result, they had an influence on how the research results could have an impact and could therefore motivate others to also work with insights from their research, in addition to being motivated to achieve impact from an already relevant subject. If there was no facilitation, or if the relevance of the research disappeared because the subject was overtaken by a new reality, there was no facilitation in the further development of usable products. In addition, it also affected the motivation of the researchers involved to take steps in this direction.

Although no further research has been done into these mediating factors of influence, because we usually cannot influence them directly, it is important to mention them. When discussing research objectives, a plan can be made for impact, for example based on the previously described impact plan (Reed, 2016), which also identifies pitfalls and can include things such as facilities. In this way, the preconditions for the desired impact can be laid down at an early stage, coordinated with relevant stakeholders and also regularly evaluated during the process and adjusted where necessary.

## Restrictions

During the data collection, various attempts were made to increase the limited response to the survey. The amount of available contact data was already somewhat limited (N=32), and during execution it also turned out that 4 of the addresses used were no longer correct, which led to a total N=28 of potential participants reached. The response rate (21.4%) is relatively low. With an N=6 of total participants, the extent to which statements can be made about our research as a whole must be questioned.

Because of this, no general statements can be made about the impact of research conducted by the research group based on the results of this study. The research question can only be answered to a limited extent based on the limited sample in the survey and interviews.

## Recommendations

Although it is not possible to give a complete picture of the impact of our previous research, recommendations can be made based on the document analysis and the cases described in the survey and interviews.

With regard to the research design, it can be stated that our intention is in line with the needs of the educational practice. The aim is to conduct research relevant to the educational practice (of the University of Applied Sciences). However, it is noticeable that, in the past, the repertoire of actions has been limited to qualitative research. It is recommended that knowledge of quantitative research types be increased, so that a broader repertoire can be used to meet the needs of stakeholders.

When it comes to dissemination, there are two recommendations. Firstly, regarding communication and collaboration. The members of the research group are described as capable supervisors and researchers. At the same time, it is notable that there are also critical voices with regard to the coordination of needs in, for example, the way in which collaboration takes place or the results that research should deliver. It is recommended that, at the start of future research, the manner of collaboration is discussed and agreed upon with those directly involved, with attention being paid to the intended impact at an early stage on the basis of a thorough analysis of stakeholders and context. By expressing clear expectations to each other and clearly defining and recording the intended impact, and then during and after the process, also checking regularly whether the objectives are achieved and the impact is achieved, a more meaningful collaboration can be created, resulting in impact that is desirable for all parties (Franken et al., 2017; Reed, 2016). In line with this, it is perhaps also desirable to use a more accessible communication platform for exchanging assignments/questions with educational practitioners, so that this collaboration can also come about earlier.

The second recommendation from the dissemination factor concerns the accessibility of reported results. These are usually presented in Dutch. The recommendation is to provide results in both Dutch and English as standard, so that a more international audience can be reached.

The efforts in (helping to) develop usable end products and translating research results into practice in the form of interventions or products in the direct research context were relatively limited. This while partners in educational practice may have a need for more direct guidance from the research group in making this transition. The recommendation here is to come to an agreement with clients/stakeholders at an early stage with regard to the form of the product to be delivered and the division of tasks with regard to making the results from qualitative/quantitative research usable, taking into account the fact that it may be desirable for the researchers of the research group to play a greater role in the development of interventions than was previously the case.

Research always has impact. This can be as small as a change in the researcher's own thinking, or as large as changes in the actions of people from all over the world. The question is then what relationship this impact has with the intended impact described at the start of the research. The results showed that impact was almost always achieved, but that it by no means always was the impact that was intended. In addition, it turned out that it can be very difficult to measure impact at a later stage when the involvement of stakeholders has already declined for some time. Here, too, we have a role to play. Making agreements on the securing and evaluation of implemented changes can contribute to the data collection on impact at a later stage. This also benefits the stakeholders. We can evaluate our own research and its impact, which at the same time gives stakeholders insight into whether the change is sustainable. The key word is collaboration. Collaboration to achieve impact.

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