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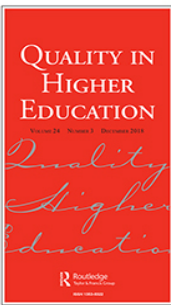
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Quality management of research, development and innovation activities in Finnish universities of applied sciences

Matti Kajaste 

Department of Social Sciences and Philosophy, University of Jyväskylä, Jyväskylä, Finland

ABSTRACT

This study utilises the quality audit reports of Finnish Universities of Applied Sciences to describe the quality management of their research, development and innovation activities (RDI). The institutions are trying to find ways of enlarging the volume of RDI activities and this is clearly reflected in the ways in which they manage quality. Much of the focus lies on the project proposal preparation phase and strategic direction of resources, while less attention has been paid to monitoring and developing the quality of the output. These emphases are analysed in relation to Harvey & Green's seminal notions on quality in an attempt to see how useful this theoretical framework is in explaining perceptions on quality in RDI activities. More research should be done on the conceptualisation of quality in especially non-university higher education sector.

KEYWORDS

Universities of applied sciences; research; development and innovation activities; quality systems; quality

Introduction

The quality management of research, development and innovation (RDI) activities of universities of applied sciences (UAS) is an area almost totally neglected in studies of quality in higher education. In fact, little is known about it as most of the attention is traditionally placed upon quality management and evaluation of education. Nor do the *European Standards and Guidelines for Quality Assurance in the European Higher Education Area* (ENQA, 2015) require institutions or quality assurance agencies to focus on quality management of research. Finland and the Finnish Education Evaluation Centre (FINEEC) are in this case something of an exception. A distinction should be made between institutional evaluations of research excellence (for example the British Research Excellence Framework), which many countries utilise and audits of quality management of research activities. While the former focuses primarily on the quality of the output, the latter usually concentrates on the quality systems that are used to monitor

CONTACT Matti Kajaste  matti.kajaste@gmail.com

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and develop the quality of the process and output. Quality management of research and innovation activities is not included in the institutional audits of most European higher education systems, with the notable exceptions of Denmark, Austria, Switzerland and Finland, according to the Quality Audit Network (AQ Austria, 2014). Still, the volume of the RDI is slowly but surely rising and the quality management of these activities is increasingly receiving attention.

The purpose of this study is to find out how the Finnish UAS have interpreted the notion of quality of RDI activities. This is reflected by the systems with which the quality of activities is managed. This article also describes the principal mechanisms of quality management of RDI used in Finland to facilitate learning and dissemination of these practices. As empirical data, the article utilises the audit reports' chapters on quality management of RDI activities in Finnish UAS produced by the Finnish Education Evaluation Centre (FINEEC). The primary material consists of 15 audit report chapters (listed in the references), dealing with about 65% of the total population of Finnish UAS. The study does not concentrate on the views of audit teams on the UAS RDI or compare the audit teams but uses the data produced by them to reflect on the phenomenon being evaluated. This article dwells on RDI activities in Finland but since UAS elsewhere in Europe share many of the same challenges (Hazelkorn, 2008; de Weert & Soo, 2009) the findings are highly relevant to many actors in the UAS sector, quality agencies and on the governmental level.

Notions of quality

Quality in higher education is a topic that is loose and elusive to allow for many different definitions and viewpoints but, at the same time, is important enough to attract endless discussions in literature and seminars. Van Vught (1996) and Stensaker (2004) have found quality a slippery concept, which is difficult to adequately categorise. Clear-cut definition has been hard to achieve despite, and perhaps due to, the popularity of its usage. Garvin (1988) and Reeves and Bednar (1994) have noted that different definitions have been used in various circumstances. Quality is a philosophical concept that lacks not only robust general theory in the literature of higher education research (Green, 1994; Westerheijden, 1999) but also a political concept that is continuously redefined in steering and rhetoric to suit shifting policy needs. Quality in higher education is not only a concept for academic discussion but also the definitions can be extremely important, since they relate to the goals set for higher education and find concrete expression in actual policies, goals, indicators and funding régimes. It is tightly linked to decision-making processes on both the institutional (Brennan & Shah, 2000) and national level.

Quality of activities should be separated from the notion of quality management (Harvey, 2006). Quality management refers to ‘the procedures, processes or systems that the higher education institution uses to maintain and develop the quality of its activities’ (FINEEC, 2015). Quality, on the other hand, can have many dimensions. Harvey and Green (1993) divided notions of quality into five discrete but interrelated groups that have been extremely influential in higher education research. They provide a useful set of frameworks through which various views on quality can be analysed (Lomas, 2002). Quality can be seen as of exceptionally high level, as perfection or consistent, as value for money, as transformation or as fitness for purpose. Speaking from a Finnish perspective, Lyytinen *et al.* (2017) found that higher education stakeholders often interpret quality as value for money or fitness of purpose, expecting a return for the investments made in teaching, research and societal interaction. The authors themselves find that academia defines quality as excellence, achieving and exceeding high standards. Education is a form of personal transformation while fitness for purpose relates to whether the institution is achieving the goals it is supposed to fulfil. Harvey & Green’s notions of quality are intended for quality in higher education and teaching, which is also the focus of much of the literature in quality assurance and management. Quality management of research and even more so, RDI activities, are not topics that have attracted much serious attention from researchers (Harvey & Williams 2010).

The fitness-for-purpose approach to quality has become the most widely adopted approach to evaluate quality in higher education (Woodhouse, 1996; Wicks & Roethlein, 2009) most likely due to its flexibility and capacity to cater for a wide range of intended purposes. Harvey & Williams (2010) date its origins back to Total Quality Management philosophy in industry that certainly aimed at producing workable concepts for many different kinds of circumstances. In its flexibility lies the principal weakness. While purpose is the key component of the notion of quality, there is no agreement on what purpose and for whose purpose. Quality can therefore become a dimension of simple customer satisfaction and pursuit of value for money (Cheng, 2017).

A conclusion appears to rise from the literature on quality in higher education. Due to a multitude of reasons there is no single clear-cut notion or even generally accepted categorisation of quality. It is a concept that is relative and very easily redefined to suit shifting needs. As quality is in the eye of the beholder, it becomes interesting to view intended purposes of an institution through analysis of its quality management efforts. What kind of purpose have the Finnish UAS set for their research, development and innovation activities?

Quality audits in Finland

Audits of quality systems of higher education institutions have been conducted by, first, the Finnish Higher Education Evaluation Council (FINHEEC) in

2005–2014 and, from 2014 onwards, by the Finnish Education Evaluation Centre (FINEEC). Audits concentrate on the quality systems of Finnish higher education institutions, universities and UAS. FINHEEC (subsequently FINEEC) started the quality audits in 2005 and began the second round of audits in 2012. A third round of audits will begin in 2018. The focus of audits is not on the quality of education or research in itself but on the various mechanisms and activities, the institutions use to monitor and develop their activities. The current criteria and process are described in detail in FINEEC's audit manual (FINEEC 2015).

One of the audit targets is quality management of research, development and innovation activities as well as artistic activities. The evaluation is conducted by an external team of experts that normally has five members and a project manager from FINEEC. Three of the members have backgrounds in higher education, one is a working life representative (normally from a company or a public organisation) and one member is a student. The audits in English were conducted by audit teams that had at least three non-Finnish members. The team makes a statement on the stage of the quality management on a scale that spans Absent—Emerging—Developing—Advanced.

The qualitative material of audit report chapters was analysed using qualitative content analysis as described in Neuendorf (2002) and Schreier (2014). First, all chapters were read once, UAS by UAS, to gain good general understanding of the data in general. This built upon the experience and previous analysis conducted by the author when involved in FINEEC's original evaluation processes. A coding framework was then constructed for themes emerging from the data. Coding was done using Nvivo 11 qualitative analysis software. In practice, this meant highlighting sentences and paragraphs in the audit reports that dealt, for example, with the project approval phase. The reports mostly follow the logic of the audit criteria used and tend to deal with the same issues. Coding itself was done twice by the author for enhanced reliability. When a disagreement between codings was found, those cases were looked into more closely and corrected. Finally, a synthesis of each theme was formed.

There are some caveats that should be noted when utilising data derived from evaluations. The university of applied sciences produced its self-evaluation report and other material for the purposes of external audit team. Usually the reports are written by the quality manager supported by a small group of people from the top management of the organisation. The audit team analyses the written material and a series of interviews are held, where university of applied sciences representatives and stakeholders are asked about quality management of RDI, in addition to other things. The audit team then gives a formal suggestion on the outcome of the audit. The university of applied sciences, therefore, has an interest in describing its situation in way that would lead to a positive outcome. The quality of self-

evaluation reports certainly varies, as does the performance of audit teams in fulfilling their task. The audit teams utilise the same evaluation criteria but it does not prescribe in exact detail which issues the audit team must address. There is also variation in the level of expertise and experience in the teams' competence in RDI activities. Despite the training of the audit team members, there is inevitable variance in interpretation and issues that the teams have chosen to focus on. This variance, again, shows in the data used in this study as differences in level of detail of analysis in particular.

Research, development and innovation activities in Finnish UAS

The nature of university of applied sciences' research, development and innovation work is an elusive and difficult phenomenon to define. Many researchers on the topic (Pakarinen *et al.*, 2001; Lyytinen *et al.*, 2003, 2008; Remahl, 2010; De Weert, 2011) have however provided characteristics of it, which assist in understanding different dimensions of the issue. Raij and Jaroma (2009) reviewed Finnish UAS RDI directors' views on the nature of RDI. The directors saw UAS as producers of new knowledge and inventions, promoters of innovations and transferors of knowledge and competence. The RDI activities are based on the needs of working life, funders and customers. RDI should produce information that is directly usable either by education or working life, usually in the form of new practices or upgraded solutions. This makes UAS RDI fundamentally different from the traditional basic research done on the university sector.

The RDI activities tend to be conducted in co-operation with a multitude of other actors and partners. These may include RDI staff, teachers, students, working life representatives from companies and public organisations, research institutions and universities. Hautamäki (2007) described this partnership as an ecosystem of innovations, where many actors, including companies, educational organisations, financiers, public actors and institutions innovate in close co-operation producing and piloting new ideas. Due to the legislation and the background of the UAS sector, the one major focus for the RDI activities, is the regional dimension. UAS have been given the task of responding primarily to the needs of education and regional working life in the Act on UAS (Ministry of Education and Culture, Finland, 2014).

RDI activities has been part of the national performance-based funding criteria for the UAS since 2014. Fifteen per cent of the total funding is provided according to RDI, where 8% is set according to external competitive funding, 4% on UAS masters' degrees, 2% on publications (including artistic activities, audio-visual materials and software) and 1% according to international mobility of the staff. This is a fairly recent development and its effects were experienced only in the most recent audits. UAS acquire external funding from various sources, most notably from the EU through structural funds but

also spend internal educational funding to support their RDI activities. Next, the findings of the data analysis are explored.

Strategic management of RDI

UAS are regional higher education institutions. They are intended to operate to respond to the needs that the region has for professionals, knowledge and competences. On a strategic level, it is therefore not surprising that according to the audit reports, RDI strategies connect fairly well to strategies of the surrounding region.

Overall, the strategy connection of RDI quality management appears to be quite strong. One audit team also noted that the aim of focusing the RDI activities in select number of fields as outlined in most UAS strategies runs contrary to the other common aim of expanding the activities. The top management acts as a gatekeeper to cancel project proposals that do not conform to the institution strategy, thus limiting the potential RDI volume. The UAS sector therefore finds itself repeatedly balancing between these two interests.

UAS have generally selected three to five overall strategic goals for RDI. The intentions are often to foster the integration between RDI and education and to update teachers' working-life knowledge through participation in RDI activities with working-life partners. Enlarging the volume of RDI activities is closely tied to external, competitive funding. It appears that UAS have recognised that their RDI activities are not as sufficiently well known in the region or in the business sector (Maassen *et al.*, 2012). Therefore, many UAS have set closer networking with regional, national and international stakeholders as a strategic goal. Internationalisation of RDI is only emerging and many UAS and audit teams state this as a development target.

UAS generally aim at directing the RDI projects to a limited number of focus areas that ideally are the same or similar as those raised in regional development strategies. The aim is to build larger and longer RDI programmes to accumulate knowledge and expertise and avoid splintering of RDI efforts into isolated projects. Usually the number of focus areas is quite large even for small institutions and many UAS struggle in actively selecting out focus areas in which they will not concentrate on. Furthermore, the areas are quite vague so their power in directing activities is limited. Luoma *et al.* (2016) reached a similar conclusion in their analysis of the strategies of Finnish universities. Audit teams generally list the RDI focus areas of the UAS in the audit reports. At times, the audit teams have also mentioned if they have seen evidence of RDI projects being actively directed to the focus areas. Mikkeli University of Applied Sciences (MAMK) was the only example, where the audit team lauded the university's activities in directing RDI. Usually, the reports were critical in this respect. It appears that, overall, the strategic leadership aspect of quality management in RDI has not yet been fully developed.

Robust mechanisms for project approval

UAS that have passed the audit have built fairly robust internal mechanisms for selection and approval of research and development projects. Project ideas originate generally from the educational units and they are often scrutinised first on the unit level. The project proposal is then evaluated by a RDI team or group, which assess the merits of the idea and often deals also with potential of integrating the RDI project to education. Some UAS, such as MAMK and Tampere University of Applied Sciences (TAMK), have set up specific RDI teams for each strategic RDI focus area to ensure the various project proposals adhere to the UAS strategic priorities. If passed, the project will be granted a modest sum of internal funding, which is translated into teachers' working time that they spend developing the proposal for external funding bodies. The final project proposal application is finally approved by the top management team of the university, usually chaired by the rector or vice-rector for RDI. The rationale for this mechanism is to ensure that the RDI activities conform to the strategy of the institution. The RDI activities in UAS do not therefore enjoy freedom of research in the same sense as in the university sector. Instead, the RDI work is much more strictly controlled and focused to the strategic intentions of the institution.

The strong top-down control of RDI can be explained by the simultaneous interest of expanding RDI activities and creating added value to the project partners. In order to maximise the benefits to the region, create critical mass and accumulate expertise, splintering of RDI efforts to various areas has been seen as harmful (Raij & Jaroma 2009). Looking back at FINHEEC's study of audit reports from the first round, it is apparent that a significant shift has occurred in quality management of RDI projects. In 2012, Talvinen stated: 'Projects are also evaluated after they are finished, and some institutions even assess the feasibility of projects beforehand'. The reports of the second round of audits show that tight scrutiny of project proposals has become the norm in Finnish UAS.

A number of audit teams, especially international teams, have quite strongly criticised the formality and rigidity of these internal selection procedures. Although the institutions themselves have seen that the overall quality of project proposals and success-rate in funding attraction have risen, the foreign experts have warned that the mechanical and perhaps bureaucratic nature of the internal selection processes may hinder creativity and prevent truly original ideas from emerging. Some audit teams have warned that this could demotivate UAS staff and counteract the sector-wide intention of increasing the RDI volume. Two kinds of criticism are, therefore, presented in the audit reports on strategic direction of UAS RDI activities. On the one hand, strategic focus areas are sometimes seen as too numerous and vague to provide meaningful framework for concentrating the efforts, while, on the other, international audit

teams find the direction of resources as restricting freedom of research and motivation of researchers. Overall, it seems that the principal notion of quality driven by the UAS is not necessarily excellence of output but fitness for purpose in generating sizeable volume of projects.

Indicators focus mostly on volume of RDI

Since the Finnish Ministry of Education and Culture has begun to provide performance-based RDI funding, most Finnish UAS are intent on expanding their RDI activities. Audit reports state that most UAS follow the RDI indicators set in the Ministry of Education and Culture's funding model but some have added a few of their own. ECTS credits earned by students in RDI projects is quite commonly used as an indicator of RDI-education integration. Most UAS also monitor stakeholder or project partner satisfaction levels through feedback. In addition, new contracts to entrepreneurship incubators and spinoffs are also monitored in some of the UAS.

As increasing the volume of RDI activities is an important goal for most Finnish UAS, the quality management systems in most institutions are also geared to support this goal. Subsequently, the use of indicators on impact and quality of RDI activities appears to be extremely rare, which some audit teams have pointed out. Although the Finnish audit process does not evaluate the quality of the output, it assumes that the institution has the necessary measures in place to monitor and develop the quality of its research output.

This may also be a result of the performance-based funding scheme that rewards for success in attracting competitive funding from external sources but does not take into account output quality. It seems that the struggle to expand the volume of activities currently outweighs the concern for output quality. The audit team for JAMK University of Applied Sciences suggested incorporating a research assessment exercise to monitor the output quality:

Because higher education quality is assessed on the basis of academic output, the audit team recommends that a research assessment exercise is conducted to provide an independent assessment of RDI quality, benchmarking information and establish reputational yardsticks. This should be repeated on regular intervals. (Hazelkorn *et al.*, 2013, p. 66)

This is linked to the fitness-for-purpose notion of quality. While excellent results of RDI projects may be the aim of all actors and stakeholders, success is difficult to show and evaluate when outcomes are not easily measured (Cheng, 2017). The primary outcome of a university of applied sciences RDI project is not usually new knowledge in the form of an academic publication but the intended result may be increased knowledge or competence in a few regional small or medium-sized enterprises, which is intensely difficult to quantify. This also contributes to the situation, where the university is able

to monitor the volume of activities but has much less information on whether it serves the interests of the regional stakeholders. The struggle to expand the volume of RDI activities is not unique to Finnish UAS but similar pressure is felt in UAS across Europe (Hallonsten, 2012; Hazekorn, 2004; Kyvik & Skodvin, 2003; Lepori & Kyvik, 2010; de Weert & Soo, 2009).

The embedded organisation of RDI activities

In most UAS the overall direction of RDI activities has been delegated to a vice-rector or a RDI director. Often an RDI management team operates under the director (or vice-rector) with representatives from various units. Most Finnish UAS have embedded the bulk of the RDI activities to educational units, with the intention of better catering for the integration of RDI and education. However, most UAS still maintain a dedicated RDI support unit that facilitates the application process for external funding and deals with much of the administrative burden related to the RDI projects. The RDI support unit may host the staff members involved in the most demanding RDI projects but normally most of the research and development is done in the educational units. Due to changes in the Ministry of Education and Culture's funding scheme, namely introduction of competitive RDI funding as a performance-based indicator, Laurea University of Applied Sciences and Centria University of Applied Sciences have gone against the traditional grain and founded dedicated RDI units, where most of the RDI activities are intended to be done:

Laurea has recently dramatically reorganised its research, development and innovation activities to pursue a larger share of the external competitive RDI funding. However, the [university] possesses established and functional procedures for developing and maintaining the quality of its RDI activities. (Kainulainen *et al.*, 2016, p. 50)

Perhaps dedicated RDI units that, according to Marttila *et al.* (2005), were common especially in the early stages of UAS RDI activities, are re-emerging.

Variance of stakeholder involvement in quality management

UAS RDI activities are closely connected to the region and therefore the regional stakeholders are expected to have an important role. According to the audit reports, the extent and channels of their involvement vary a great deal amongst the UAS. Stakeholders are normally invited to provide feedback for each individual RDI project at the end of the project duration. However, the utilisation of the feedback from an ending project to new a starting one is not systematic in all UAS:

Based on the evidence from the audit, feedback is not collected systematically in each project/assignment and different formats and templates are still used. Although a recommendation was made in the previous audit demanding that monitoring,

clarity, standardisation and utilisation of R&D and working life feedback should be improved, it is clear that very few improvements have been made. (Davidson *et al.*, 2015, p. 53)

When the feedback is collected through different forms and methods in different disciplines, it makes the quality management of the overall RDI efforts very difficult. The stakeholders interviewed during the audit visit usually speak very positively about the UAS RDI efforts in the region. The problem is that although the stakeholders are often happy to take part in the planning and realisation of actual projects, they are less willing to spend time in the quality management of RDI, especially if it involves time-consuming filling of questionnaires or other cumbersome manoeuvres. In some of the reports, the audit teams have found that stakeholder relations are mostly conducted through bilateral personal relationships between companies and the UAS. While this is often the most convenient way of keeping in touch, it can be vulnerable when persons leave either workplace. Lyytinen *et al.* (2017) also found that partly due to a long tradition of strong state governance, Finnish higher education institutions have not developed a tradition of systematically incorporating external stakeholder relationships as a major part of quality management. The authors regret, having studied three Finnish universities and two UAS that overall external stakeholder relationships are not systematically organised, developed or identified. Therefore, the quality management of these relationships is under-developed.

The most advanced UAS in terms of RDI quality management, however, not only collect stakeholder feedback systematically in various stages of the projects but also use stakeholder surveys and other means of collecting feedback information, such as focus group discussions. This information is then analysed and systematically utilised in development of new projects and RDI activities as a whole. Advisory boards consisting of local and regional stakeholders are an established practice in practically every Finnish university of applied sciences. Therefore, their absence in audit reports in relation to RDI was slightly surprising. Advisory boards are mentioned only in the reports of Laurea, SAMK and TAMK. They clearly are an asset that the UAS could utilise to greater extent in planning and developing of RDI efforts. One possible reason for their under-utilisation could be underlying tensions concerning differing viewpoints, needs and objectives between the UAS and its stakeholders. Harvey and Green (1993) stressed that the concept of quality held by the external stakeholders can well be very different from that of academia

External and internal evaluations

Similarly to advisory boards, internal evaluations of RDI activities are also not widely present in audit reports. Several UAS have conducted internal

evaluations of RDI activities or quality management of RDI activities during the past ten years but this is not apparent in audit reports. Perhaps the reason is that only very few UAS, for example Centria, have decided to conduct these evaluations with a set periodicity, while the majority have not. Audit teams have welcomed these evaluations as useful exercises whenever they are mentioned. Another highlighted good practice has been self-evaluations of RDI project groups that is part of the quality management of RDI at least in Turku University of Applied Sciences (Turku AMK). A handful of UAS have also commissioned external evaluations of their RDI work, which is also mentioned in the audit reports.

Integration in to education at the forefront

Integration of RDI into degree education and *vice versa* is an important goal for the UAS. It is a stated objective in the legislation concerning UAS in Finland and the UAS top management appears to support the goal uniformly (Hyrkkänen, 2007; Kohtamäki, 2015a, 2015b). Thus, it is also reflected in the quality management of RDI. The possibilities of integration are scrutinised in the project proposal stage and many quality mechanisms have been introduced to the quality systems to support this goal. For example, MAMK requires project groups to draft a separate plan for each RDI project on how the project will connect to the degree education in the university of applied sciences. One of the intended purposes of UAS RDI quality management appears to be to facilitate the closer integration of the two principal tasks of the institution.

There appears, however, to be major variation amongst UAS and between disciplines inside institutions on the progress and intensity of RDI-education integration. This finding concurs with a number of previous studies on Finnish UAS RDI (Lyytinen *et al.*, 2003; Nykänen *et al.*, 2008; Koivula *et al.*, 2009; Kohtamäki, 2015a, 2015b). Despite the many efforts of the UAS management, nearly every audit report notes that the interviewed students were not aware of the UAS RDI efforts or had not been involved in the projects. It is, however, possible that when the studies are well integrated into RDI projects, the students have, in fact, been unaware of their participation in RDI activities.

UAS conduct many different kinds of RDI projects. Projects with external, competitive funding are typically applied research or working life development projects, where the workforce involved consists usually of full-time dedicated RDI staff and some teachers. UAS also have projects, which are mainly funded by internal funding and tend to involve more students and teachers. The latter are much easier to integrate into teaching than the former, which appear to remain largely inaccessible to the majority of students. Since the UAS experience difficulties in incorporating undergraduates in externally funded RDI projects and any potential research assistant jobs would be very few in

number, students are not actively informed about these possibilities. In other words, this lack of awareness amongst the student population is intentional.

It is quite interesting that the relationship between research, development and innovation activities and education appears to be quite different in the UAS sector from that in the universities. In the latter, professors and lecturers are expected to enrich teaching by bringing the latest research findings to classes. In the UAS sector, the motivation is mainly to enrich education by enabling students to take part in RDI projects. In either case, the objective is rarely to enrich the RDI activities themselves but mostly the education. This is noted in some of the audit reports and mostly with criticism. The audit reports also did not include examples of UAS actively directing their efforts towards certain types of RDI activities, such as applied research or working life development projects.

Conclusion

One of the principal characteristics of the RDI work of Finnish UAS is high degree systemic diversity (Lyytinen *et al.*, 2008; Välimaa & Neuvonen-Rauhala, 2010; Ministry of Education and Culture, 2010; Maassen *et al.*, 2012). The volume, forms, working force used and sources of funding of RDI activities are highly divergent between institutions across the sector. What is surprising, therefore, is that UAS approaches quality management of RDI activities, are on the whole, fairly similar. There is a danger, which Filippakou (2011) emphasised in the context of the United Kingdom, that quality assurance can create a monolithic understanding of quality, which then acts to limit the ways the purpose of higher education is understood. According to the Finnish audit reports, the indicators used to monitor the activities are nearly uniform across the sector. The rigorous scrutiny on project proposals is emphasised in most report chapters. Also, the limited role of students, especially in externally funded RDI projects is very similar in all cases of the data.

The data shows that Finnish UAS have geared their quality management systems towards enlarging the volume of their RDI activities, preferably in a select number of focus areas. Most UAS have built robust internal project application procedures, which aim at ensuring that the funding applications drafted, are competitive and serve both region and the institution. A project proposal has to be good enough to attract external funding and must connect to one of the strategic focus areas of the organisation to prevent splintering of the activities. Attracting external funding is an increasingly challenging hurdle in itself as competition for research funding intensifies. In this stage of development of UAS, the expansion of RDI can be seen as an end in itself. Far less attention is directed towards impact and the quality of the output of the projects since monitoring these factors is much more difficult and not necessary from the viewpoint of the national funding scheme. A key quality of output aspect here is the stakeholder satisfaction, which is usually monitored

through surveys. However, the relevant stakeholder is usually intimately involved in the RDI project and may well lack other possible institutions in the region to turn to, if the university of applied science disappoints. Audit teams have suggested both incorporating other indicators on quality of RDI and conducting external evaluations of RDI that are not limited to assessing the quality of the process but also the level of output.

Returning to the research questions posed in the beginning, the data does provide evidence on the notions of quality as adopted by Finnish UAS in relation to quality management of research, development and innovation activities. Currently, it appears that since the priority for many UAS is increasing the total volume of the RDI function, acquiring external funding is indication of the quality in itself. The emphasis on volume of RDI activities and the adherence of RDI projects to the strategic choices of the institution reflects on the adopted notions of quality. Of the five separate, but overlapping notions put forward by Harvey and Green (1993), the principal quality notion employed by the top management of UAS in RDI is fitness for purpose. Quality management system can be a very effective tool in directing activities towards this intended purpose. Simultaneously, the data does not include much evidence of the notion of quality as pursuit of excellence that university research traditionally aims at.

Another main observation can be made. UAS have clearly decided to concentrate on the quality management of the RDI process. The data shows the tools utilised across the sector for maintaining and developing the quality of RDI projects. Talvinen (2012, p. 63) made an observation on behalf of FINHEEC from the first round of audits in 2012, noting that: 'In fact, several audit reports point out the lack of mechanisms in universities of applied sciences for recognizing inadequate quality in R&D activities'. Today, this is no longer the case as the UAS use a wide arsenal of quality management procedures to prevent project shortcomings. In Harvey's elaborated categorisation on notions of quality (2006) this can be understood to be part of quality as consistency. Therefore, the focus is placed not on the output of the activities but on the process through which the output is produced. The UAS is intent in making sure that the infrastructure and the resources available for the project to succeed are adequate and the results can be expected to be satisfactory. As policy implications, one finds that the next step for UAS would be to raise the level of ambition in quality management of RDI and construct more robust indicators on the quality and impact of their RDI outputs. The difficulty here is, as stated previously, that the expected output of UAS RDI activities does not usually manifest itself in a quantifiable academic publication but new competences or improved solutions in partner organisations, such as small companies or local hospitals. Furthermore, a multitude of various interests is directed towards the RDI activities but no general consensus exists on the sector, on what the most desirable forms and functions of UAS RDI actually are. This makes building accepted indicators on output quality even harder.

Barnett (1999) has argued that the discussion on quality in higher education is always a power struggle, where various actors and stakeholders advance their partisan views on what the institutions should prioritise through rhetoric of quality. Perceptions on quality are therefore never entirely neutral and always carry at least a tacit idea on the purpose of higher education. Using Deming's approach to quality in the industrial sector as a basis for analysis of quality assurance development in the United States, the United Kingdom and the Netherlands, Dill (1995) suggested that quality assurance policies are most effective in generating improvements when they foster the development of social capital in the higher education system. Indeed, one could argue that more robust indicators of RDI output quality would greatly benefit the sector as a whole. The UAS' total RDI volume in 2016 was only 11% of the research volume of the university sector in Finland. Convincing, evidence-based arguments are very much needed to expand the public expenditure in UAS RDI activities.

The majority of research literature on quality in higher education, including Harvey & Green's notions of quality, deals primarily with the educational function of universities (Harvey & Williams 2010). Much less attention has been paid, both in literature and in the field of policy, on quality management of research and even less on the research, development and innovation activities. It therefore seems that there is a tendency to utilise quality concepts and policies built for the sphere of education also in research, although the fit might not be perfect. This is especially apparent in the applied RDI. Above, we saw that Harvey & Green's notions of quality do have relevance in the UAS RDI but it is possible that more natural theoretical framework could actually be found in the realm of quality management of industrial research and development projects, which the UAS RDI quite closely resembles. Much more attention should, in the future, be placed on the conceptualisation of quality and quality management in research and especially applied research activities.

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ORCID

Matti Kajaste  <http://orcid.org/0000-0002-4718-3508>

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Appendix. Audited Finnish universities of applied sciences 2012–2016

Name of UAS	Abbreviation	Year of publication	Language used
Kymenlaakso UAS	KYAMK	2012	Finnish
Novia UAS	Novia	2012	Swedish
Jyväskylä UAS	JAMK	2013	English
Mikkeli UAS	MAMK	2013	Finnish
Kajaani UAS	KAMK	2015	Finnish
Vaasa UAS	VAMK	2015	English
Häme UAS	HAMK	2016	English
Centria UAS	Centria	2016	Finnish
Lahti UAS	LAMK	2016	English
Laurea UAS	Laurea	2016	English
Satakunta UAS	SAMK	2016	Finnish
Savonia UAS	Savonia	2016	Finnish
Seinäjoki UAS	SEAMK	2016	English
Tampere UAS	TAMK	2016	English
Turku UAS	Turku AMK	2016	Finnish