# MID-TERM RESEARCH EVALUATION 2021

## University of Jyväskylä

**Final report**

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# Content

# 1 Summary

The University of Jyväskylä (JYU) conducted its previous research evaluation in 2018, based on which the units made their research development plans. To monitor and, more importantly, to promote the implementation of the development plans, JYU conducted a follow-up research evaluation in 2021 where the evaluation period was 2018–2020.

The mid-term research evaluation was carried out in a participatory manner. Each evaluation unit conducted a self-evaluation, which researchers of all career stages were invited to participate in. This was aimed at getting as diverse a picture as possible of the progress of the research development actions and new ideas on how the unit could further develop its research environment. Based on the self-evaluation, the units updated their research development plans, which were exposed to internal peer reviewing. After discussing with the representatives of the unit and familiarizing themselves with the background material, the internal peer reviewers gave a written statement on the progress of the research development plan. They also provided feedback on how a unit could develop its research environment towards more conducive in producing research of high quality. Based on the reviewers' statement, the unit revised its research development plan.

The mid-term evaluation revealed that the units had used the results of research evaluation 2018 in their planning and strategy work. They had not only implemented their current research development plan but also had identified new development areas and actions. The development areas included 1) Research, publication, and communication strategies, 2) Publishing activities, 3) Internationalization, 4) Source and volume of competitive external funding, 5) Research facilities and infrastructure, 6) Organisation culture, 7) Researchers' wellbeing and professional development, 8) Doctoral training, and 9) Collaboration. The goal of all of these development areas was to strengthen the level of research through a variety of activities.

The peer reviewers reported that the implementation of the majority of development actions had progressed on schedule. If a unit had made changes to its plan, it has done so for a justified reason. A unit has had to change its plans due to factors such as the COVID-19 pandemic, lack of human resources, personnel changes, and in order to avoid overlapping with university level actions.

The self-evaluation reports suggest that the nature of mid-term research evaluation process has offered the units an opportunity to reflect their actions and develop their practices. In addition, there were indications that the internal peer reviewing promoted the sharing of good practices, which may contribute to developing the research environment at JYU.

# 2 Overview of research at the University of Jyväskylä

## 2.1 Strategy and research profile of the University of Jyväskylä

The University of Jyväskylä (JYU) is a research university with six faculties and two independent institutes conducting research (Figure 1). The current JYU's strategy 2030 (University of Jyväskylä, 2019c), which was formulated in collaboration with the JYU community, defines six strategic core fields of research. The strategic core fields are

1) Basic natural phenomena and mathematical thinking
2) Information technology and the human in the knowledge society
3) Language, culture and society
4) Learning, teaching and interaction
5) Physical activity, health and wellbeing
6) Sustainable business and economics

JYU implements its strategy through five development programmes, which focus on the development of research, education, digitalisation, university community, or campus. The research development programme aims (University of Jyväskylä, 2019b) to create attractive research careers at JYU and to enhance researchers' competence, research services, and research infrastructure. An example of the actions initiated in this programme is the project manager services, launched in 2020, which provides its services to large research consortium projects in order to ease the administrative task load of the principal investigators.

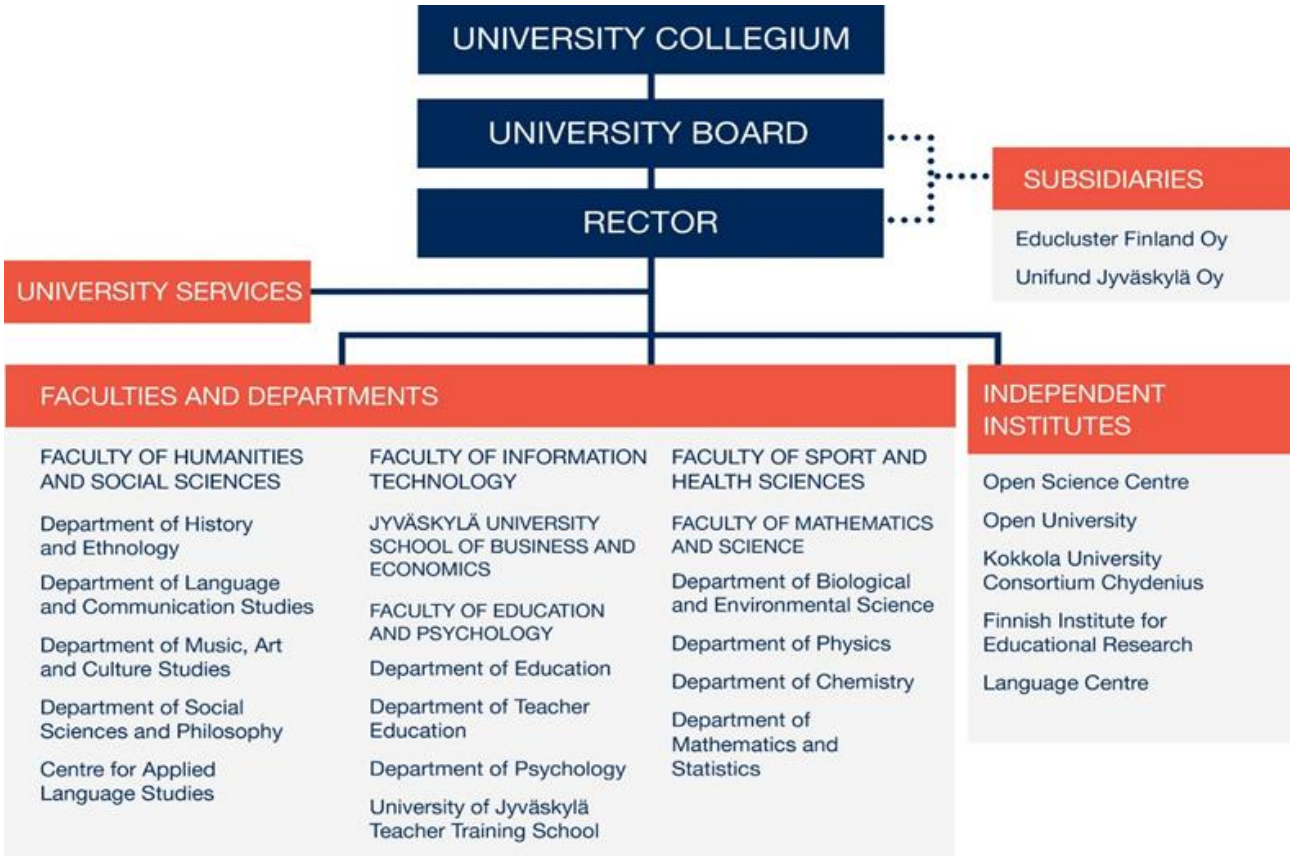


Figure 1. The University of Jyväskylä's organisation since 2017. Out of the independent institutes, Kokkola University Consortium Chydenius and Finnish Institute for Educational Research conduct research.

The position of JYU among the Finnish universities in international university differ with the ranking list (Figure 2). In field-specific rankings, its position has been relative stabile over the last three years (Table 1). Because of methodological differences e.g. in used databases, bibliometric indicators, the number of ranked institutions, and in the classification of fields, one should not compare ranking lists.

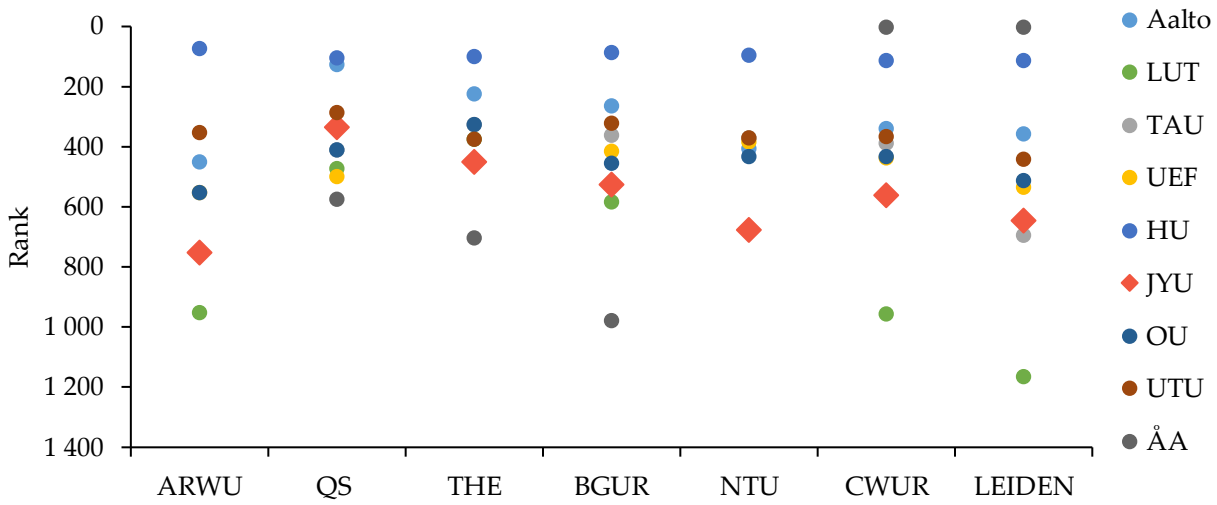


Figure 2. Finnish universities in the newest international university rankings (as of April 2021). Aalto = Aalto University, LUT = LUT University, TAU = Tampere University, UEF = University of Eastern Finland, HU = University of Helsinki, JYU = University of Jyväskylä, OU = University of Oulu, UTU = University of Turku, ÅA = Åbo Akademi University.

Table 1. JYU's position among world and Finnish universities in selected international field- and subject-specific rankings in two years. In the country rank, the number after the slash indicates the number of Finnish universities in the ranking list. Source: Academic Ranking of World Universities (www.shanghairanking.com); Times Higher Education World University Rankings by subject (www.timeshighereducation.com/world-university-rankings).

| Ranking | World rank | | Country rank | |
|---|---|---|---|---|
| Academic Ranking of World Universities | | | | |
| Field | 2018 | 2020 | 2018 | 2020 |
| Mathematics | 101–150 | 101–150 | 2/4 | 2/4 |
| Physics | 301–400 | 401–500 | 3–4/5 | 4–5/5 |
| Chemistry | 201–300 | 201–300 | 1–2/3 | 1–2/3 |
| Ecology | 201–300 | 301–400 | 2–3/6 | 4–5/6 |
| Computer Science & Engineering | 301–400 | 401–500 | 4–5/5 | 5/5 |
| Biological Sciences | 401–500 | | 7/7 | |
| Education | 101–150 | 36 | 1–2/6* | 1/6 |
| Communication | 201–300 | 101–150 | 3–5/5* | 2/5 |
| Psychology | 201–300 | 201–300 | 2–3/5* | 2–3/6* |
| Business Administration | 301–400 | 301–400 | 3–5/5* | 3–5/5* |
| Economics | | 401–500 | | 3/3 |
| Management | 301–400 | 401–500 | 2–3/4* | 2–5/5* |
| Political Sciences | | 301–400 | | 4–5/5* |
| Global Ranking of Sport Science Schools and Departments | – | 9 | | 1/1 |
| Clinical Medicine (at JYU Gerontology) | | 401–500 | | 6/6 |
| Public Health | | 401–500 | | 6/6 |
| Hospitality and Tourism Management (at JYU Sport & Tourism) | | 201–300 | | 3/3 |
| Times Higher Education World University Rankings by Subject | | | | |
| Subject | 2019 | 2021 | 2019 | 2021 |
| Arts & Humanities | 176–200 | 201–250 | 3/7 | 3/8 |
| Education | 95 | 67 | 2/6 | 2/7 |
| Computer Science | 401–500 | 501–600 | 8/8 | 7/7 |
| Physical Sciences | 301–400 | 301–400 | 2–3/6* | 2–3/6* |
| Clinical, pre-clinical and health | 301–400 | 401–500 | 5–6/6* | 5–6/6* |
| Psychology | 151–175 | 201–250 | 2/5 | 2–5/6* |
| Business & Economics | 301–400 | 251–300 | 4–6/7* | 3/7 |
| Social Sciences | 201–250 | 251–300 | 2–3/5* | 2–4/6* |

*Finnish universities within the same rank range in the country rank.

## 2.2 Research personnel

In addition to the 1 600 researchers (amounting to about 1 400 FTEs) with an employment relationship with JYU (Figure 3a), about 500 grant researchers work at JYU. The highest proportion of researchers works at the Faculty of Mathematics and Science, and the Faculty of Humanities and Social Science (Figure 3b). JYU has about 1 600 doctoral students, and an average of 147 doctoral students per year graduated during 2018–2020 (Table 2). Thus, JYU achieved its doctoral degree goal (in average 138 degrees for the agreement period of 2017–2020), which had been set in negotiations with the Ministry of Education and Culture (Jyväskylän yliopiston sopimus).

During the evaluation period, some changes took place in the JYU research personnel structure. The FTEs of research career I decreased whereas that of II has increased (Figure 3a). Overall, the proportion of women has stayed relative stabile (Figure 3c). Women

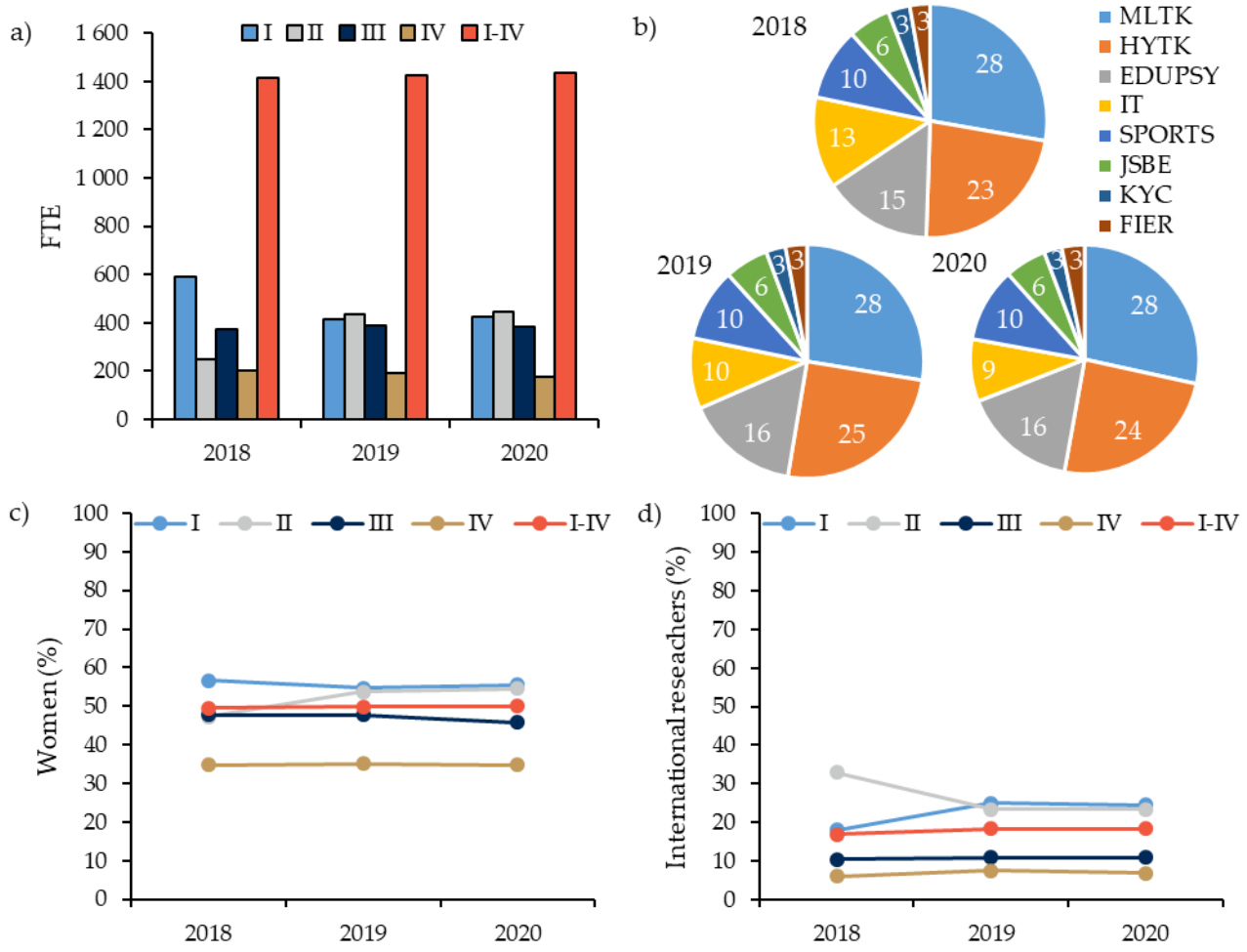


Figure 3. Research personnel at JYU in 2018–2020. a) Full-time equivalent (FTE) in research career stages I–IV. b) Personnel (%) by the faculties and independent institutes. c) Proportion of women (%) by research career stages. The red line indicates the proportion of women (to total FTEs) among research personnel in career stages I–IV. d) Proportion of international personnel (%) by research career stages. The red line shows the proportion of international personnel (to total FTEs) among research personnel in career stages I–IV. The figures do not include part-time teachers. FTEs are based data on December 31. Source: JYU data warehouse (23.3.2021).

accounted for 50 % of total research FTEs that is an internationally high figure. For example, OECD (2021) reported women to account for 17–43 % of the total number of researchers in different OECD countries in 2019. The data in Vipunen Reporting Portal (Vipunen Educational Statistics Finland, 2021a) shows that at Finnish universities women made up from 30 % to 64 % of research FTEs with an average of 42 % in 2020. Although at first glance there seems to be a gender balanced research personnel at JYU, there is a leakage between career stages. Women formed the majority of researchers in career stages I and II at JYU, but this did not translate into their greater presence in the highest career stages. This seems to be a global phenomenon (UNESCO, 2015). At JYU, women were in a minority both in career stages III with a decrease of 2 percentage points and in IV with no change from 2018 to 2020. Significant changes occurred only in career stage II, where the proportion of female researchers increased by 7 percentage points, thereby exceeding the proportion of male researchers. In addition to the variation between career stages, the proportion of women in research FTEs varied by faculties, ranging from 27 % in the Faculty of Information Technology to 73 % in the Faculty of Education and Psychology in 2020. At Finnish (Auranen *et al.*, 2018) and word universities (UNESCO, 2015), disciplines typically show the gender balance differences.

The overall level of JYU's research community's internationality has not changed much in 2018–2020, with about one fifth of research personnel (Figure 3d) and one fifth of doctoral students coming from abroad (Table 2). JYU's figures are slightly lower compared to the combined figures of Finnish universities where international research personnel made up one fourth of research FTEs in years 2018–2020 (Vipunen Educational Statistics Finland, 2021a). However, the proportion of international researchers varies considerably across Finnish universities. For example, in 2020 their proportion ranged from 8 % to 47 % (Vipunen Educational Statistics Finland, 2021a). As with other Finnish universities (Vipunen Educational Statistics Finland, 2021a), JYU has the highest proportion of international personnel in career stages I and II. A closer look at Figure 3d reveals that at JYU the proportion of international personnel has increased by 6 percentage points in career stage I and decreased by 10 percentage points in II from 2018 to 2020 but remained unchanged in the two highest career stages. Similar change in career stages I and II has been reported also at other Finnish universities during the period of 2012–2017 (Auranen *et al.*, 2018). Furthermore, the level of internationality differed between JYU faculties. International researchers made up only about one fifth of research FTEs at the Faculty of Sport and Health Sciences as well as at the Faculty of Education and Psychology, while at the Faculty of Mathematics and Science, their contribution was about one third.

Table 2. Annual number of doctoral students who have registered for attendance and completed doctoral degrees at JYU in 2018–2020. Source: JYU data warehouse.

| | 2018 | 2019 | 2020 |
|---|---|---|---|
| Doctoral students | 1 658 | 1 631 | 1 638 |
| International doctoral students (%) | 21 | 21 | 20 |
| Doctoral degrees | 139 | 127 | 174 |
| Doctoral degrees, international (%) | 30 | 28 | 22 |

## 2.3 External research funding

Based on annual use, external research funding constituted about one third of the total funding at university level and from one fifth to about half of the total funding at the evaluation unit level. In addition to the unit level variation, the amount of external funding showed annual variation during the evaluation period, being highest in 2018. The most important funding agency was the Academy of Finland, followed by the European Union and the Ministry of Education and Culture (Figure 4). When we look at the amount of granted funding (Figure 5), the figures reveals that the Academy of Finland was not only the most important funder, but it also granted biggest amount of funding per project (over 400 000 €/project on average) (Figure 5b).

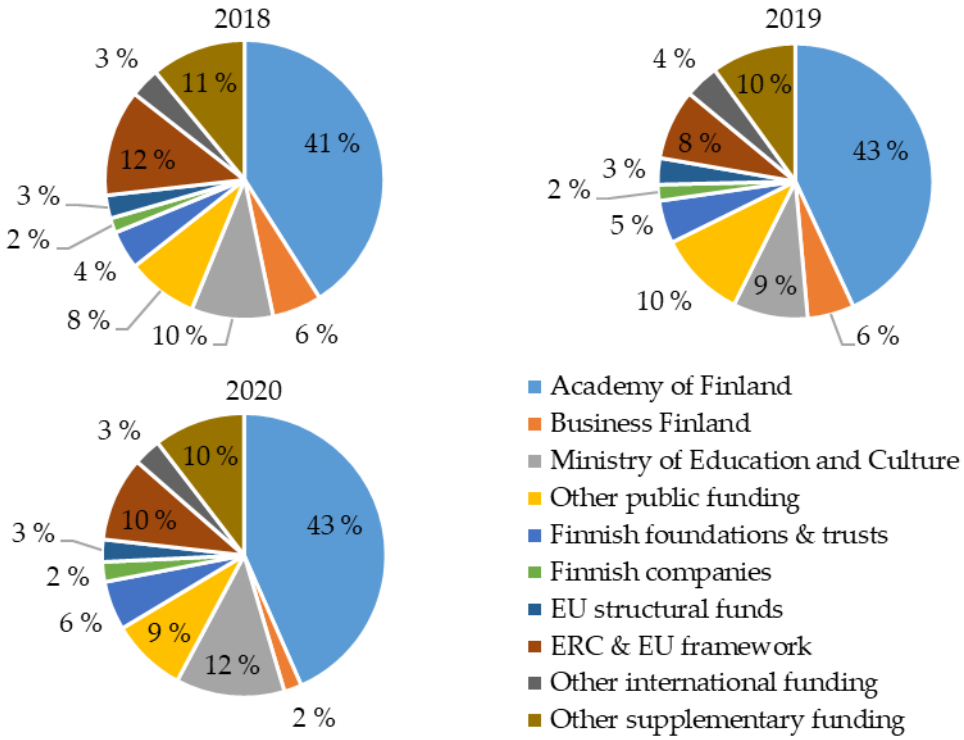


Figure 4. Sources of external funding at JYU in 2018–2020. The percentages show expenditure financed by a funder of costs covered by external funding. Other public funding includes funding by Finnish ministries (excluding Ministry of Education and Culture), municipalities and other public sector. Other supplementary funding includes other EU funding, foreign foundations, international trusts, international companies, and other international funding. Note that cut-offs are not taken into account in the figures. Source: SAP Finance (Feb 2021).

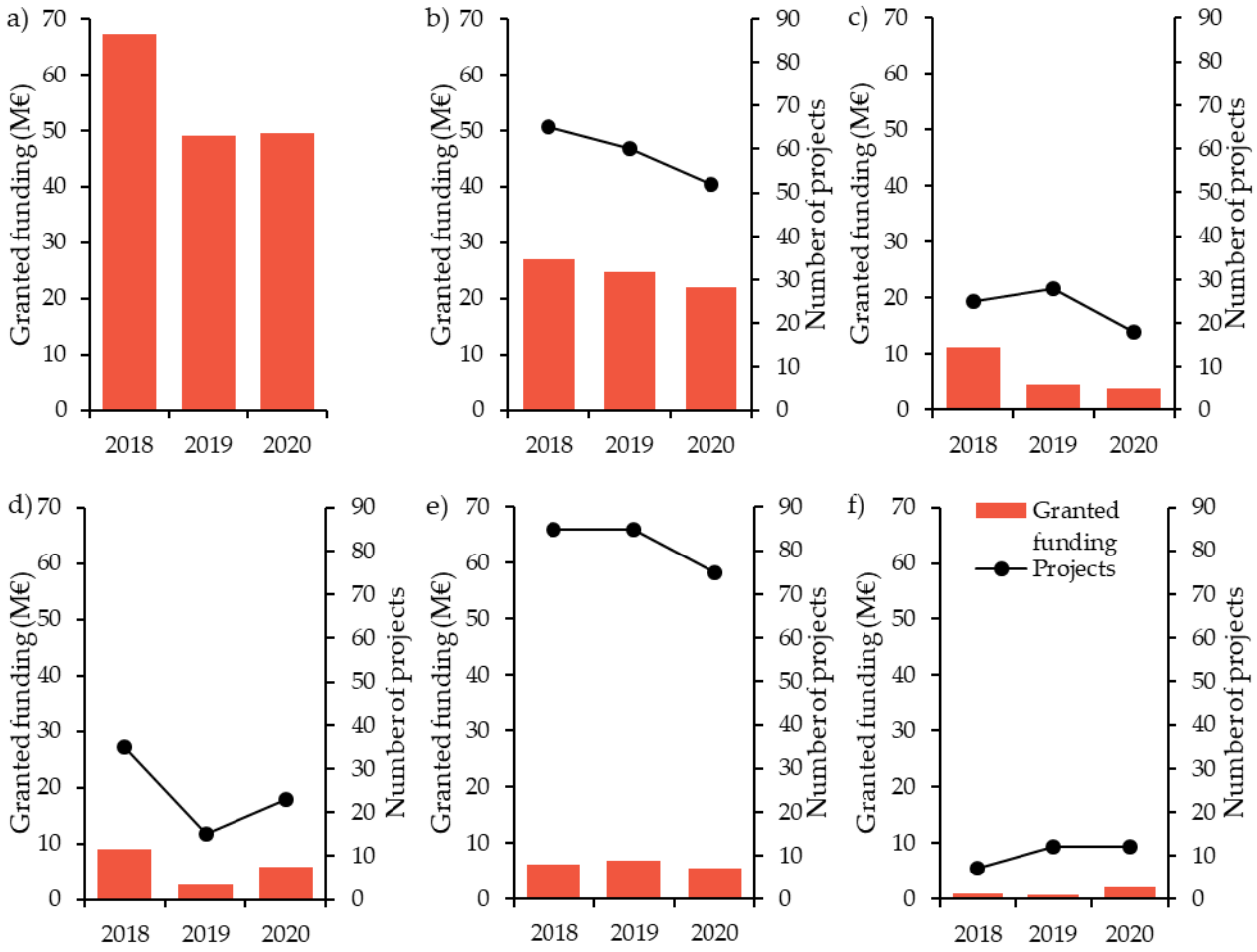


Figure 5. Granted external funding a) in total (M€) and b–f) by the five main funders in 2018–2020. Granted funding and the number of funded projects/researchers by b) the Academy of Finland (excluding PROFI funding), decisions on funding for salary costs and funding for research costs of Academy Research Fellows or Academy Professors are calculated as a single decision, c) EU, d) the Ministry of Education and Culture, e) Finnish foundations and trusts, the data on which is incomplete, and f) Business Finland. The year refers to the year when the funding decision was made. The figures include only the funding granted to the JYU's units, which conduct research. Source: Converis (8.4.2021).

Table 3. The number of funded projects/researchers by the Academy of Finland in decision years 2018–2020. The figure in parentheses indicates the total number of funded (sub)projects/researchers in the call. The table shows also the amount of funding granted to JYU and JYU's proportion of the total granted funding in Academy project calls. Only the main funding instruments and two special calls are included. Hyphen in a cell refers to that there has not been a call at all. Source: (Academy of Finland, 2019; 2020; 2021).

| Funding instrument | 2018 | 2019 | 2020 |
|---|---|---|---|
| Postdoctoral Researchers | 11 (99) | 6 (118) | 7 (105) |
| Academy Research Fellows | 4 (65) | 6 (65) | 8 (67) |
| Academy Professors | 1 (10) | – | 2 (10) |
| Academy Projects | 24 (228) | 24 (311) | 14 (263) |
| Granted funding in total (M€) | 11.0 (11.0 %) | 10.7 (8.2 %) | 6.4 (5.6 %) |
| Centres of Excellence | 3 (12) | – | – |
| Research into COVID-19 epidemic (subprojects) | – | – | 2 (44) |
| Research into COVID-19 vaccines and pharmaceutical development (subprojects) | – | – | 3 (24) |

The success rate of JYU in the Academy's main funding instruments for individual researchers (Postdoctoral Researchers, Academy Research Fellows, Academy Projects, and Clinical Researchers) showed a decline trend during the last three years, being 18 % in 2018, 17 % in 2019, and 13 % in 2020 (Academy of Finland, 2020). JYU, however, improved its success in Academy Research Fellows calls both relatively and in the number of granted positions (Table 3). In Academy project calls, both the amount and the share of the funding granted to JYU declined from 2018 to 2020 (Table 3).

Likewise, the competition for EU funding, such as the European Research Council (ERC) funding, is intense. In 2018–2020, the ERC awarded 59 ERC grants to Finland (European Research Council, 2021), out of which four (7 %) to researchers at JYU (Table 4). Although the funding from all EU funding programmes decreased (Figure 5c) and Business Finland granted more funding than previously (Figure 5f), EU funding was of greater significance for JYU than Business Finland funding (Figure 4) as it was also in the previous evaluation period of 2010–2017 (Lyytinen *et al.*, 2019). Finnish foundations and trusts were also more significant funders than Business Finland, awarding numerous small research grants (Figure 5e).

Table 4. The number of ERC grantees by funding scheme, decision year, location of host institute at time of application, and success rate in 2018–2020. Only years when there were grantees at JYU are included. Source: (European Research Council, 2021).

| | Grantees at JYU | Grantees in Finland | Grantees in total | Success rate of all proposals (%) |
|---|---|---|---|---|
| 2018 | | | | |
| ERC Proof of Concept Grant[1] | 1 | 5 | 160 | 38 |
| 2019 | | | | |
| ERC Starting Grant | 1 | 5 | 407 | 13 |
| ERC Advanced Grant | 1 | 3 | 222 | 11 |
| 2020 | | | | |
| ERC Consolidator Grant | 1 | 6 | 327 | 13 |

[1]The funding scheme is only open to ERC grantees.

During the evaluation period, individual researchers and research groups at JYU held research funding from funding instruments, which are among the most prestigious ones. One Academy of Finland's Centre of Excellence (CoE) completed (CoE in Analysis and Dynamics Research, 2014–2019) and three new ones were launched for the period of 2018–2025 (Table 3). Of the new CoEs, JYU coordinates the CoE in Research on Ageing and Care and is a partner institute in the CoE in Inverse Modelling and Imaging, and CoE in Game Culture Studies. In 2018–2020, JYU hosted four Academy Professorships (Table 5), which are highly esteemed positions awarded by the Academy of Finland. The success of the applicants from JYU continued in 2020, when the Academy awarded two new Academy Professorships (Table 5). Furthermore, there were 13 researchers at JYU, who received a grant from the European Research Council (ERC) (Table 5). In 2020, the list of ERC grant holders at JYU increased by one researcher (Table 5).

Table 5. Academy Professors and European Research Council (ERC) grant holders at the University of Jyväskylä in chronological order. The ERC funding schemes are the Starting (StG), Consolidator (CoG), Advanced (AdG), and Proof of Concept (PoC) Grants. Source: (Academy of Finland, 2021; European Research Council, 2021).

| Post | Department | Funding period |
|---|---|---|
| Academy Professor | | |
| Petri Toiviainen | Music, Arts and Cultural Studies | 2014–2018 |
| Hannu Häkkinen | Chemistry & Physics | 2016–2020 |
| Sara Heinämaa | Social Sciences and Philosophy | 2017–2021 |
| Johanna Mappes[1] | Biological and Environmental Science | 2019–2023 |
| Pasi Ihalainen | History and Ethnology | 2021–2026 |
| Otso Ovaskainen | Biological and Environmental Science | 2021–2026 |
| ERC grant principal investigator | | |
| Marja Tiirola (CoG) | Biological and Environmental Science | 2014–2019 |
| Tuuli Lähdesmäki (StG) | Music, Art and Culture Studies | 2015–2020 |
| Jari Kaukua (CoG) | Social Sciences and Philosophy | 2016–2021 |
| Tuomas Lappi (CoG) | Physics | 2016–2021 |
| Taina Rantanen (AdG) | Faculty of Sport and Health Sciences | 2016–2021 |
| Enrico Le Donne (StG) | Mathematics and Statistics | 2017–2022 |
| Marja Tiirola (PoG) | Biological and Environmental Science | 2018–2020 |
| Anu Kankainen (CoG) | Physics | 2018–2023 |
| Anna Kuparinen (CoG) | Biological and Environmental Science | 2018–2023 |
| Mikko Salo (CoG) | Mathematics and Statistics | 2018–2023 |
| Heikki Tuononen (CoG) | Chemistry | 2018–2023 |
| Carlos Salgado (AdG)[2] | Physics | 2019–2024 |
| Juha Muhonen (StG) | Physics | 2020–2025 |
| Minna Torppa (CoG) | Teacher Education | 2021–2026 |

[1] Until 31.8.2020 at JYU

[2] Principal investigator C. Salgado (University of Santiago de Compostela, Spain) with researchers from JYU (Harri Niemi, Kari Eskola and Tuomas Lappi)

## 2.4 Publications

We do not see significant changes in JYU's publication output during the evaluation period of 2018–2020 or compared to the previous evaluation period of 2010–2017 (Lyytinen *et al.*, 2019). JYU produced about 3 300 publications annually (Figure 6a), most of which were scientific peer reviewed articles (Figure 6b), written in English (Table 6) and produced with collaboration (Figure 7). JYU accounted for 8 % of the Finnish universities' A–E type publications in 2018–2019 (Vipunen Educational Statistics Finland, 2021b). The publication profile of JYU (Figure 8) reflects both its multidisciplinary nature and the differences in discipline size within the University. Disciplines with the highest number of researchers (natural sciences, humanities, social sciences; Figure 3b) contributed most significantly to the publication output.

The majority of peer-reviewed scientific publications and scientific books produced at JYU (94–95 %) was placed in JUFO levels 1 to 3 (Figure 6c). The distribution of publications into JUFO levels changed during the evaluation period. JYU published relatively more in the two highest and less in the two lowest JUFO levels in 2020 than in 2018. One should note that the new rating of publication channels entered in force in 2019 (Publication Forum, 2021) which, along with the annual complementary evaluation, may have some effect on the figures. As the majority of publication channels is assigned to JUFO level 1 (Publication Forum, 2021), it is not surprising that most of the JYU publication output was published in publication channels at this level. The relative distribution of JYU publications into JUFO levels is quite similar as what we see in the combined data of all Finnish universities in 2018–2019 (0: 6 %, 1: 58 %, 2: 25 %, 3: 11 %) (Vipunen Educational Statistics Finland, 2021b).

JYU strives for open science, defining its open science policy in its strategy (University of Jyväskylä, 2019c) and publishing policy (University of Jyväskylä, 2020). JYU's articles have systematically been parallel published in JYU's digital repository JYX since 2016. Furthermore, in spring 2020, JYU implemented, as the first Finnish university, the widespread collection and publication of metadata of all research datasets. Metadata are gathered in research information system Converis, data are stored centrally and securely, and published when possible. The proportion of openly published publications was high at JYU (Figure 6d, e). Of the peer-reviewed scientific articles published in 2018–2020 at JYU, 81 % was openly published. Units' open access level varied from 66 % to 90 %, which might reflect discipline-specific publishing practices (Severin *et al.*, 2020). In 2019, the Ministry of Education and Culture assessed the openness of operating cultures at Finnish universities, according to which openness at JYU is at the highest possible level (Forsström *et al.*, 2019). This finding suggests that JYU's efforts to encourage its researchers to publish their publication openly have been successful.

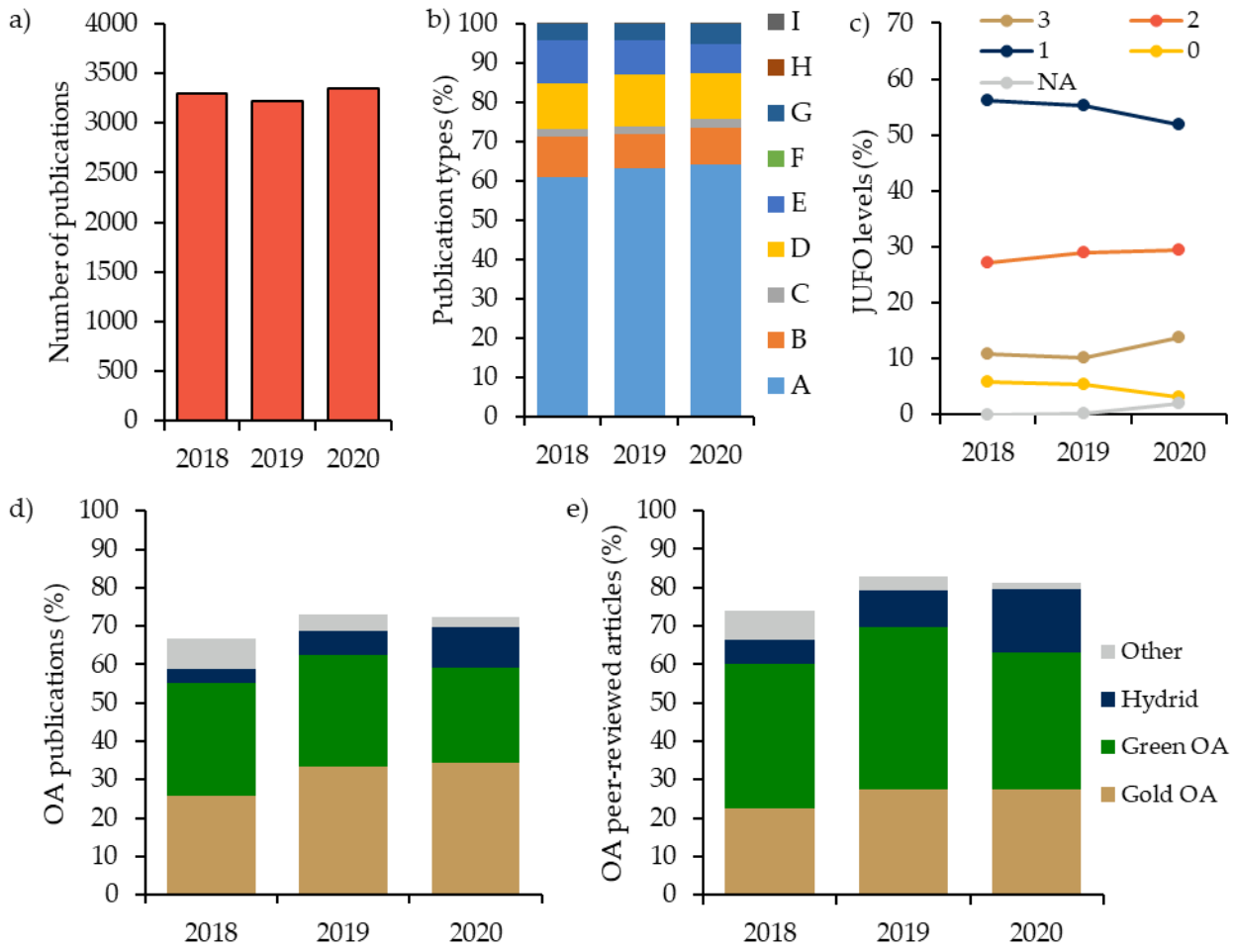


Figure 6. Publication output at the University of Jyväskylä in 2018–2020. a) Number of publications as whole counts. b) Proportion of publications by classification of the Ministry of Education and Culture. Publication type "G theses" includes only doctoral theses. c) Proportion of publications by Publication Forum (JUFO) levels in publication types A and C. NA = publication's JUFO classification not available. d) Proportion of open access (OA) publishing to all publications. e) Proportion of open access publishing to peer reviewed scientific articles (publication type A). In line with the definition by the Ministry of Education and Culture, OA preprints (non-refereed submitted manuscripts) are not included in the OA figures. Source: Converis (15.3.2021).

As mentioned above, the proportion of publications with co-authorship is high at JYU (Figure 7), indicating a considerable amount of research collaboration. Co-authored publications, especially the presence of international co-authorship, are reported to be associated with increased citation rates (e.g., Van Raan, 1998; Glänzel and Schubert, 2001; Auranen *et al.*, 2018). Bibliometric indicators for JYU publication are in line with these findings (Table 7). Furthermore, the co-authored publications produced at JYU received more citations than the world average (Table 7). This suggests that JYU researchers conduct the high quality and scientifically impactful research (e.g., Aksnes, 2003). See critique on the use of citation counts as an indicator of scientific quality in publications e.g., by Seglen (1998) and MacRoberts & MacRoberts (2018).

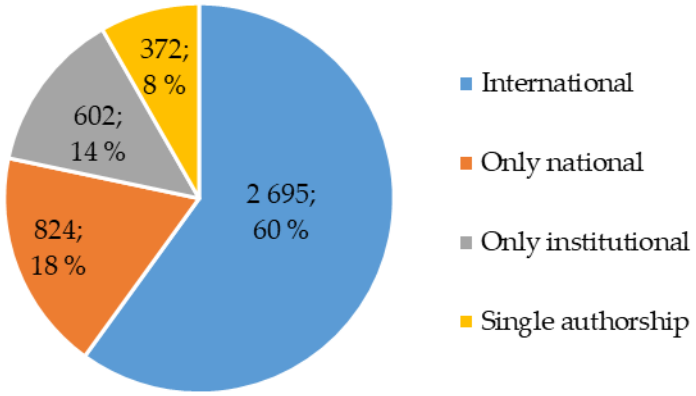


Figure 7. The number and proportion of publications with international, only national, and only institutional co-authorship, and single authorship in 2018–2020. These categories are mutually exclusive. All publication types included (n = 4 493). Source: Scopus (16.3.2021).

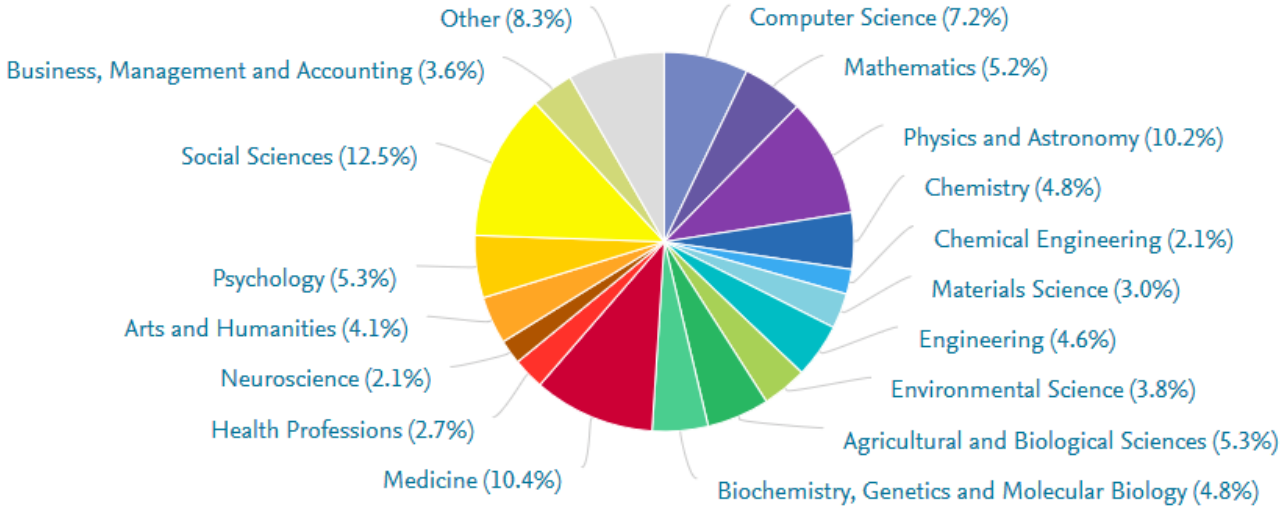


Figure 8. University of Jyväskylä publication output by field of science of publications over the years 2018–2020. All publication types included (n = 4 493). The field of science of a publication is based on the subject areas, into which a publication channel is classified in SciVal (i.e. in Scopus database). Source: Scopus (16.3.2021).

Table 6. Proportion publications (%) by publication language in 2018–2020. The category "other publication types" includes publications intended for professional communities, publications intended for the general public, public artistic and design activities, doctoral theses, patents and invention disclosures, and audio-visual material & ICT software. Source: Converis (15.3.2021).

| Publication type and language | 2018 | 2019 | 2020 |
|---|---|---|---|
| All publications | | | |
| English | 62 | 65 | 67 |
| Finnish | 36 | 34 | 31 |
| Other | 2 | 1 | 1 |
| Peer-reviewed scientific articles | | | |
| English | 87 | 88 | 89 |
| Finnish | 11 | 11 | 10 |
| Other | 1 | 1 | 1 |
| Non-refereed scientific articles | | | |
| English | 30 | 35 | 36 |
| Finnish | 66 | 63 | 62 |
| Other | 4 | 1 | 2 |
| Scientific books (monographs) | | | |
| English | 58 | 63 | 71 |
| Finnish | 38 | 34 | 25 |
| Other | 5 | 3 | 4 |
| Other publication types | | | |
| English | 18 | 20 | 22 |
| Finnish | 81 | 79 | 77 |
| Other | 1 | 1 | 1 |

Table 7. Summary bibliometric indicators for the publications by collaboration type over the years 2018–2020 by March 16, 2021. The year refers to the year in which an item was published. All publication types and self-citations included. Source: Scopus (16.3.2021).

| Collaboration type | Number of publications | Citation count | Citations per publication | Field-weighted citation impact |
|---|---|---|---|---|
| All publications | 4 493 | 24 853 | 5.5 | 1.67 |
| International | 2 695 | 18 842 | 7.0 | 1.97 |
| Only national | 824 | 3 214 | 3.9 | 1.21 |
| Only institutional | 602 | 2 152 | 3.6 | 1.38 |
| Single authorship | 372 | 645 | 1.7 | 0.95 |

# 3 Background of the research evaluation at JYU

In 2018, the University of Jyväskylä carried out the research evaluation that covered the period of 2010–2017, with a focus on the research environment that are conducive in producing research of high quality (Lyytinen *et al.*, 2019). Based on the self-evaluation and the report by the external evaluation panel, the units drew up research developments plan where the units describe development actions they are going to take to enhance the quality of research environment. The development plan includes goals and schedule for each development action.

Previous research evaluations at JYU employed an external evaluation panel. Research Council, which acted as a supervisor of the research evaluation process, saw that internal peer review would serve best the objectives of the mid-term research evaluation and decided to conduct the mid-term research evaluation by employing internal peer-reviewers. As a by-product, this allowed good practises to be shared among the units, which was expected to contribute to the development of the research environment at JYU.

# 4 Objectives of the mid-term research evaluation

The objective of the mid-term research evaluation was to determine the implementation stage of development actions that the evaluation unit has formulated based on the evaluation panel recommendations and self-evaluation in research evaluation 2018. The ultimate goal was to promote the successful implementation of the research development plan and consequently, to maintain an encouraging and facilitating environment for research. The self-evaluation gave the evaluation unit a possibility to revise its development plan by providing information on what has done so far, successes, challenges that implementation has encountered, and adjustments of the original development plan. Based on self-evaluation and internal peer review, the unit updated its development plan. The units' research development plans complement the JYU's research development plan. They describe elaborate development actions, which the units design on the basis of their own needs.

The mid-term evaluation, keeping with the spirit of the research evaluation 2018, took developing perspective. The peer-reviewers did not rank the units or gave numerical evaluations. Instead of that, they gave the unit constructive feedback on its development plan. The units may use the results of the mid-term evaluation in their planning and strategy work.

# 5 Phases and schedule of the mid-term research evaluation

## 5.1 Tasks of the participants

### 5.1.1 Research Council

The Research Council planed, led and supervised the mid-term evaluation.

### 5.1.2 Research Services

Research Services (Research and Innovation Services) coordinated the mid-term research evaluation, compiled background material, instructed and advised the units, organised the development day for the peer review and prepared the present final report. Research Services organised a joint event for the evaluation units and peer reviewers (16.2. and 17.2.), where it presented the process of the mid-term evaluation.

### 5.1.3 Open Science Centre

Open Science Centre performed bibliometric analyses and upon the request, gave a presentation on the results of the analysis in the units.

### 5.1.4 Division of Policy and Planning

The data team from Division of Policy and Planning compiled the following background material: core funding, external research funding, Doctoral degrees, research personnel and mobility.

### 5.1.5 Evaluation units

Evaluation units conducted a self-evaluation, were responsible for the practice arrangements of self-evaluation, participated in the development day, drew up self-evaluation report, and updated the development plan.

### 5.1.6 Peer reviewers

Eight groups of two, whose members included the Vice Deans responsible for research and innovation as well as one person from each faculty, conducted the peer review (see Chapter 5.6). Peer reviewers from Kokkola University Consortium Chydenius and Finnish Institute for Educational Research were the head and one person working at the independent institute.

## 5.2 Evaluation units

The evaluation units were defined as they were in the research development plans 2018. The evaluation units were

1 Department of Social Sciences and Philosophy (YFI)
2 Department of History and Ethnology (Hela)
3 Department of Music, Art and Culture Studies (Mutku)
4 Department of Language and Communication Studies (LaCos)
5 Centre for Applied Language Studies (CALS)
6 Faculty of Sport and Health Sciences (Sports)
7 Faculty of Education and Psychology (EDUPSY) & Finnish Institute for Educational Research (FIER)
8 Faculty of Information Technology (IT)
9 Jyväskylä University School of Business and Economics (JSBE)
10 Department of Mathematics and Statistics (Maths)
11 Department of Physics (Phys)
12 Department of Chemistry (Chem)
13 Department of Biological and Environmental Science (BIOENV)
14 Kokkola University Consortium Chydenius (KYC)

## 5.3 Schedule

Self-evaluation by the evaluation unit took place in February-March 2021, followed by internal peer review (Figure 9). Revised development plans were completed in April 2021.

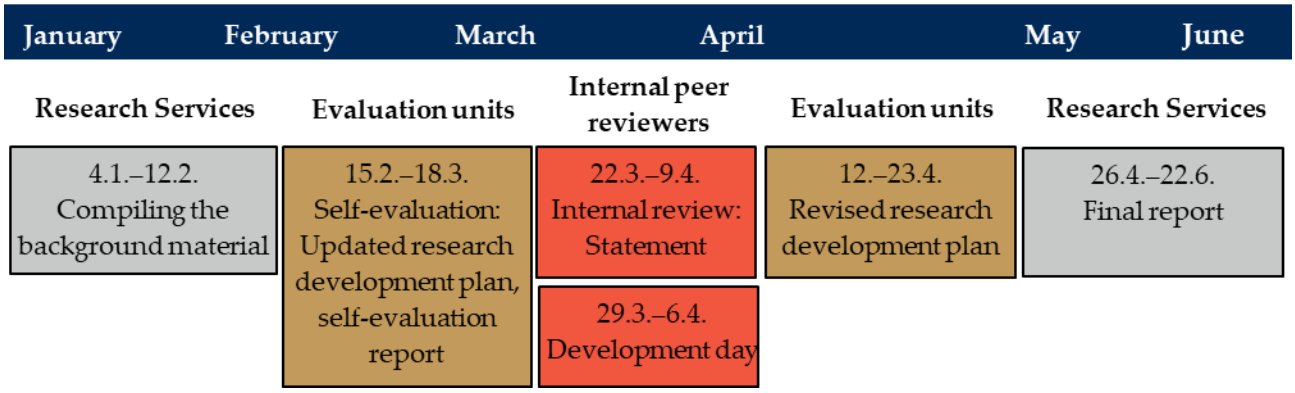


Figure 9. Schedule, stages, and responsible parties in the mid-term research evaluation.

## 5.4 Background material and its limitations

Background material, covering the years 2018–2020, to the units and peer-reviewers was provided to support evaluation and to provide a reference basis for evaluating the impacts of development actions. The Research Services (Research and Innovation Services) together with the Open Science Centre and the data team from Division of Policy and Planning compiled the background material. In addition, the units were invited to supplement the background material with the information they see essential for the evaluation.

As the aim of the present research evaluation was to see how the units had succeeded in implementing their research development plans, they were provided with Research Evaluation Report 2018 (Lyytinen *et al.*, 2019) and unit's research development plan 2018.

Data on the number of research personnel was based on data from MEPCO HRM and payroll administration system (appendix 1). Data on the amount of core and external research funding was based on the information from the SAP Finance (used funding 2018–2020) and Converis (granted funding in 2020) (appendix 2). The background material included also the number of completed doctoral degrees and undergraduate students (data source: JYU Student registry) as well as information on mobility to and from JYU (JYU's research and publication data system TUTKA, SAP Travel) (appendix 3).

The background material consisted of university rankings by subject. Because of differences in methodologies, in the classification of fields and in the number of participating institutions, rankings cannot be compared.

The bibliometric analysis provided a review of the profile and internal development of the unit's publication activity (appendix 4). It aimed, in its part, to answer the question of whether the development actions have reached their goals. One should note that data on the 2020 publications was preliminary because not all publications had yet been recorded in the databases. Publication information was collected from the Converis research information system and Scopus database (analytics tool: SciVal). Information from these databases was complemented with a JYUcite, which uses Dimensions as a database and calculates a citation impact metric Co-citation Percentile Rank (CPR) for a publication (Seppänen *et al.*, 2020). JYUcite is a new tool, which was not available in the research evaluation 2018. One should also note that the research evaluation 2018 used data from the Web of Science (WoS; analytics tool: InCites) and TUTKA (JYU's research and publication database) databases. The change is due to the fact that currently JYU has subscription to SciVal, but not to InCites. Using Scopus database instead of WoS might have some effects on the results and might complicate comparisons between the evaluation periods due to differences in e.g. database coverages and data sources. Replacing TUTKA database with Converis should not have effects on data on publication activity as both are JYU's own databases and should include data on all publications produced at JYU. The results of SciVal-based bibliometric analysis were reported if the threshold of 50 publications during the evaluation period 2018–2020 was met. When interpreting the result, one should take into account the incomplete SciVal coverage, which furthermore differs by a discipline (Figure 10) as well as discipline-specific differences in citing (e.g., Hicks, 2004; Larivière *et al.*, 2006), citing time-lag, and other factors associated with the citation rates (e.g., Leimu and Koricheva, 2005).

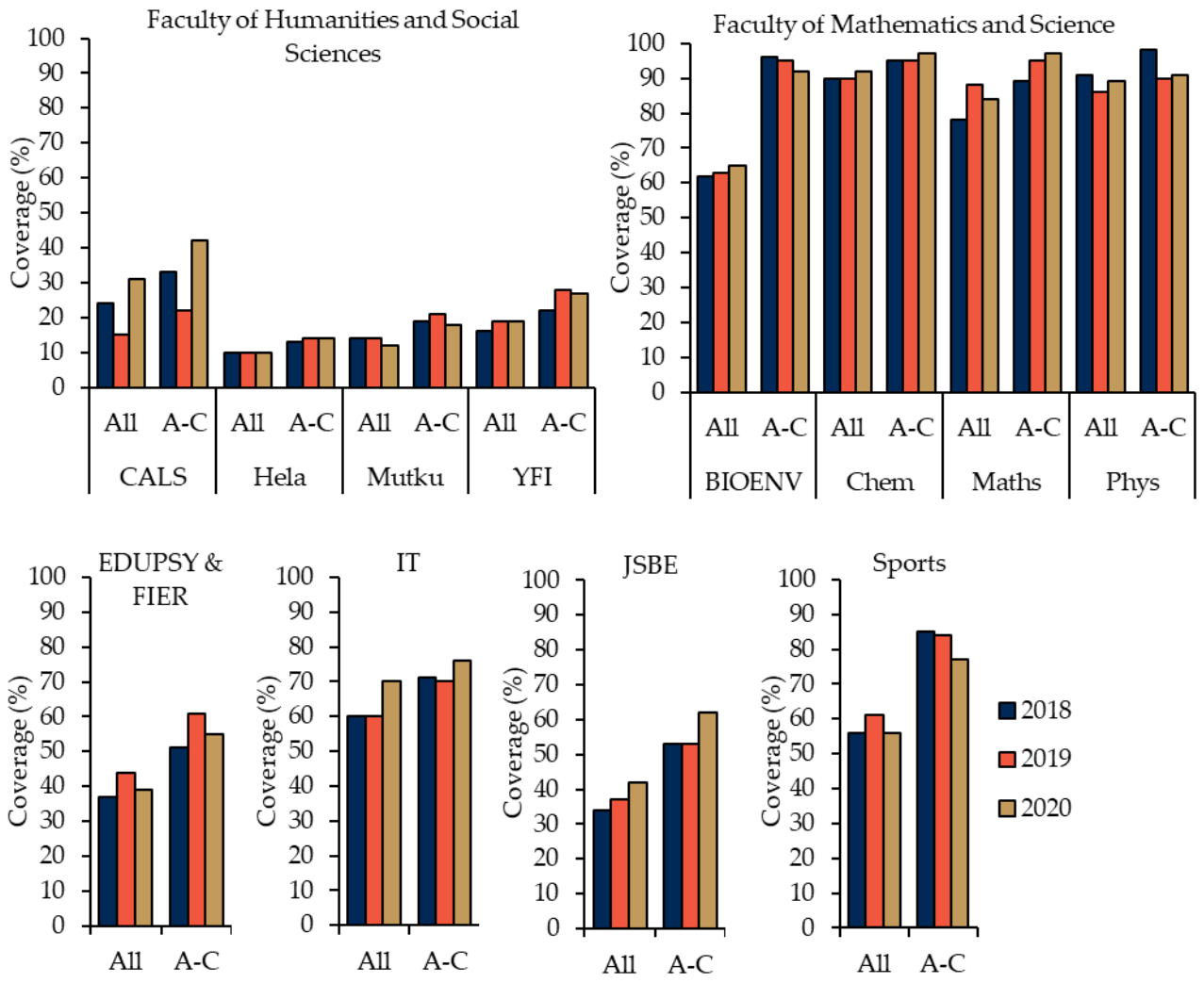


Figure 10. The coverage of SciVal database (%) by publication type in years 2018–2020. The coverage is calculated by dividing the number of publications in SciVal by the number of publications in Converis (Jan 2021). Publication type refers to the classification by the Ministry of Education and Culture: A) Peer-reviewed scientific articles, B) Non-refereed scientific articles, C) Scientific books (monographs). Explanations for abbreviations in appendix 9.

## 5.5 Self-evaluation

The aim of the self-evaluation, which took place from February 15th to March 15th, was to provide information on what has done so far, successes, challenges that implementation has encountered, and adjustments of the original research development plan. The evaluation unit decided upon the way, in which it conducted the self-evaluation and selected who participates in it (appendix 6). It was recommended, however, that participants represent all research career stages (including grant researchers), in order to provide the most complete picture of the implementation of the development plan. On the other hand, the self-evaluation should be a light procedure.

Based on the self-evaluation, the unit updated its research development plan 2018, and wrote the self-evaluation report using the report template (appendix 5). The self-evaluation report included a brief description of the self-evaluation procedure, the names of

participants, a description of the implementation of development actions, and a summary table. The deadline for self-evaluation report and the updated research development plan was March 18th 2021.

## 5.6 Internal peer review

The main objective of the internal peer review was improvement of the research development plan by giving the unit constructive feedback. The Vice Dean responsible for Research and Innovation or Head of the independent institution and one person selected by a faculty conducted the peer review (Table 8). Peer reviewers came from a faculty/independent institute, which was not the same as the faculty/independent institute of the evaluation unit. Altogether, there were eight groups of two peer reviewers.

The peer review included an online development day (duration about 2 h) in March-April 2021 (appendix 7). Prior to the development day, peer-reviewers received unit's self-evaluation report, updated research development plan and background material. The evaluation unit selected its representatives for the development day, whose selection may be based on, for example, the themes of the research development plan (appendix 6). The number of participants was not limited, but it was advised to keep reasonable in view of the time allocated to discussion (2 h).

The development day enabled the peer-reviewers to make questions and the unit to supplement information. Peer reviewers acted as chairs, and they, together with the evaluation unit, planed the content of the meeting as they wish. At the beginning of the development day, the evaluation unit gave a short overview of the unit, its research development plan and the results of its self-evaluation, after which the peer reviewers had a discussion with the representative(s) of the unit about them. Based on the discussion,

Table 8. Evaluation units and peer reviewers. Explanations for abbreviations in appendix 9.

| Evaluation unit | Peer reviewers |
|---|---|
| BIOENV | Vice Dean Vilma Luoma-aho (JSBE), Research Professor Taina Saarinen (FIER) |
| CALS | Professor Päivi Häkkinen (FIER), Professor Leena Lindström (MLTK) |
| Chem | Vice Dean Sarianna Sipilä (Sports), Associate Professor Terhi Mäntylä (EDUPSY) |
| EDUPSY & FIER | Vice Dean Jari Ojala (HYTK), Professor Timo Tiihonen (IT) |
| Hela | Vice Dean Tuure Tuunanen (IT), Associate Professor Marjo Siltaoja (JSBE) |
| IT | Vice Dean Paavo Leppänen (EDUPSY), Academy Researcher Timo Rantalainen (Sports) |
| JSBE | Director Marko Aittola (KYC), Professor Sari Pöyhönen (HYTK) |
| KYC | Vice Dean Ari Jokinen (MLTK), Professor Sari Pöyhönen (HYTK) |
| LaCos | Professor Päivi Häkkinen (FIER), Professor Leena Lindström (MLTK) |
| Maths | Vice Dean Vilma Luoma-aho (JSBE), Academy Researcher Timo Rantalainen (Sports) |
| Mutku | Vice Dean Tuure Tuunanen (IT), Associate Professor Marjo Siltaoja (JSBE) |
| Phys | Vice Dean Sarianna Sipilä (Sports), Associate Professor Terhi Mäntylä (EDUPSY) |
| Sports | Vice Dean Jari Ojala (HYTK), Professor Heidi Harju-Luukkainen (KYC) |
| YFI | Vice Dean Ari Jokinen (MLTK), Professor Timo Tiihonen (IT) |

unit's self-evaluation report, background material and updated research development plan, peer reviewers wrote a joint statement of their observations and recommendations on how to proceed from here and the feasibility of the updated research development plan (appendix 8). Peer reviewers submitted their statement no later than April 9th.

## 5.7 Revised research development plan

Based on the reviewers' statement, the unit revised its research development plan including the modifications of the original development actions, revised schedule and additional development actions (if identified). The unit submitted its revised research development plan no later than April 23rd. The development plans are only for internal use.

# 6 Summary of the self-evaluation reports and the research development plans

When interpreting the results of the self-evaluation, one should note four important points, potentially affecting results. First, unit's development actions have started earliest in 2019 and hence have not been able to affect publication output or other activities in 2018. Second, data on the 2020 publications was preliminary because not all publications had yet been recorded in the databases. Third, one should acknowledge that too little time might have elapsed since the initiation of development actions for their effects to be manifested themselves. Fourth, the COVID-19 pandemic may have hampered or delayed the implementation of the research development plan (see Chapter 8).

The units have implemented their research development plans mainly as planned although they have had to make some changes in their plans. Reasons for a need to modify the schedule or actions included a lack of human resources, personnel changes, and restrictions due to the COVID-19 pandemic. The units have abandoned some actions for example to avoid overlapping with university level actions, which have the same goals as the unit's plan. They have rescheduled actions in order to synchronise unit and upper level planning and implementation processes. In addition, some units have identified new development areas and actions, some of which was naturally only at the planning stage at the time of the mid-term evaluation.

Because the research development plans are for internal use only, the development activities are reported here only at a general level. The development plans with actions reflect the discipline-specific nature and need of each unit and thus, the actions mentioned in this chapter may not be found in all development plans and on the other hand, some actions may be missing. Instead of listing all development actions, the present final report provides examples of them. One should also note that many of the actions are quite intertwined and share the same goals, ultimately aiming at increasing the level and quality of research at JYU. The final report therefore does not discuss research, recruitment, and communication strategies as their own entities, but addresses them in the context of other development areas.

The publication profile (Chapter 2.4) has been strengthened by encouraging and supporting writing as well as formulating a publishing strategy. In the planning actions aiming at increasing the quality and volume of publication output, different support needs of researchers representing different career stages have been identified and taken into account. For example, early career researchers' publication is supported with a policy of joint authorship with senior researchers and with providing training. Publishing has been addressed in development discussions, which has emphasized the importance of high quality, international publishing, set individual goals for publishing and aimed to make a change in mindsets towards publishing more in international journals alongside publishing in national languages. In order to ensure adequate time for writing publications, time for writing has been allocated in work plans. In addition, efforts were made to organize periods, during which researchers have no other work tasks and thus would be able to focus on writing. Interactions, which facilitate exchange of ideas, knowledge and methods among

researchers, have been used as a way to increase productivity. Financial support has been provided in a form of allocating strategic funding to cover costs of open access publishing and language editing.

Internationality is an integral part of the units' research activities (Chapters 2.2 & 2.4). In order to attract international researchers to a unit, open posts were advertised internationally, unit's international visibility was increased by updating websites, visiting programmes launched, and internationally competitive research infrastructures were set up. The units acknowledged that it is vital to set up the engaging onboarding process designed specifically for international researchers. The actions of facilitating the integration of international researchers into the JYU community and Finland included organizing informal discussion sessions, having seminars in English, and assigning a local host to a visitor. Internationality has been additionally been accomplished by staff mobility, which has been encouraged by formulating individual mobility plans and by providing financial support. During the past year, internationalization faced a new challenge. The COVID19 pandemic (Chapter 8) forced to develop and to pilot new ways to carry out research visits (virtual visits) and to maintain international collaboration (virtual meetings, digital tools for collaboration).

One prerequisite for conducting research is external research funding, which constitutes up to half of the unit's funding at JYU (Chapter 2.3). The units expressed both a need and a willingness to diversify funding sources and to increase the volume of competitive external funding, with acknowledging the intense competition for funding (Table 3,Table 4). The units had tackled the challenges around funding process mainly by actions aiming at increasing applicants' competence, available time and resources to prepare proposals as well as grant proposals' quality. The actions to strengthen applicants' competences included training, organising meetings and workshops for sharing good practices and experiences, mentoring, and peer support. Furthermore, one has taken pro-active actions to increase the pool of competent applicants. That is, the recruitment process takes into account candidates' potential of acquiring external funding. To give applicants time to write their proposals, their workload is reduced during the preparation of a proposal and they can allocate time in their work plans for preparing proposals. The preparation and developing of proposals is supported by providing financial resources to conduct pilot experiments for future grants and to organize preparation meetings, and by setting up an internal consulting and reviewing process.

The developing of research facilities and infrastructure is at the core of the units' research development plans. The investment plans and strategies aim to ensure the existence of state-of-art and up-to-date infrastructure, which contributes to the reinforced research quality and the increased appeal of JYU as a site of research.

One goal in several development plans was to create and maintain an organization culture, which is characterized by, among other things, equality with all its dimensions, the consideration of multilingualism, the smooth integration of newcomers at all researcher career levels, a sense of community, a good internal communication and leadership. Equality actions meant not only those addressing gender issues (e.g., training), but also taking into account non-Finnish speaking researchers (e.g., bilingual communication) and

improving the status of grant researchers (e.g., equal working conditions). Providing the access to information and resources, social interactions with colleagues, and formal support were employed in order to help newcomers to integrate into the JYU community. A sense of community was strengthened by organizing events, updating internal communication strategy and increasing teaching collaboration.

The units' development programmes share a common goal, wellbeing, with the JYU strategy (University of Jyväskylä, 2019c), the research development programme (University of Jyväskylä, 2019b), and the university community development programme (University of Jyväskylä, 2019a). The above discussed actions, such as supporting international integration activities, contribute to researchers' wellbeing, but in addition, the development plans include actions aimed specifically at supporting wellbeing. Researchers' wellbeing was supported and nurtured, for example, by clarifying the job descriptions of researchers, improving work balance, establishing peer-support for research group leaders, and adopting a research leave system.

Support for professional development can be seen as a way to increase not only the researchers' skills and knowledge but also their wellbeing and advance their career development. Training topics included publishing, research ethics, open science, research methods, leadership, and digital skills. Internal mentorship programmes were created to support the professional development of tenure track researchers and other researchers. In addition to the formal training, informal learning opportunities were offered, such as co-supervision, co-publishing, collaborative research projects, and teaching with a more experienced researcher.

Although the graduate school fell outside the scope of the present evaluation (Chapter 4), the units had included the development of doctoral training in their development plans. This indicates that the units see doctoral researchers to be an integral part of the research community and supervision to be an essential element of high-quality research. Actions have initiated to guarantee and promote good, effective supervision for example, by organizing training and peer-support events for supervisors, and by formulating the guidelines on supervision. Dissemination of information on available opportunities for funding addressed the recognized challenges in funding for doctoral studies. Informal and formal meetings for doctoral students were initiated to provide peer-to-peer support, to increase community identity, and to offer a forum for information flow. Doctoral training was developed also through a number of other development actions, such as updating the curriculum and the recruitment strategy and process of doctoral students.

All above mentioned development actions eventually strengthen the level of research. However, one of the essential factors potentially affecting the level of research has not yet been discussed, and that is collaboration both within and outside a unit. The data on the publication output (Chapter 2.4) shows that a significant number of JYU researchers is already engaged in research collaboration. The development plans, in turn, indicate that the units are interested in pursuing an even higher rate of in-house, national and international research collaboration. The actions to stimulate new collaboration and research ideas included inviting seminar speakers outside a unit, organizing internal and external networking events (e.g., seminars), providing financial support to attend conferences and

make research visits, renewing the organization structure, forming larger research groups (building a critical mass of researchers), offering the research premises and infrastructures for collaborative use across unit boundaries, and hosting visiting fellows.

In addition to initiating the implementation of development actions according to their research development plan, the research evaluation also provided added value for the units. The research evaluation provided them an opportunity to reflect and develop their activities. The units appreciated the feedback given by the peer reviewers. They, as outsiders, gave the units new perspectives on how to develop their research activities and research environment, identified factors potentially hampering the development, which the units might have overlooked otherwise, and brought insights into the strengths.

# 7 Summary of the peer review observations

The task of the peer reviewers was not to evaluate numerically the level of research conducted at a unit or rank the units. Instead, their role was to provide constructive feedback on the unit's research development plan and its implementation. Because peer reviewers' statements are only for internal use, this chapter briefly presents the main observations and development ideas at a general level.

The peer reviewers reported the implementation to been progressed on schedule, even completed, in the majority of the plans. If the implementation had been delayed or a development action had been abandoned, the peer reviewers considered that this had been done for a justifiable reason (see Chapter 6). Although the units had initiated development actions earliest in 2019, the peer reviewers saw that some effects of the development actions were already detectable in research activities, such as in the development of publication output, internationalisation level, in-house collaboration, external funding, and the number of completed doctoral degrees.

If development actions have not progressed as planned, in their statements, the peer reviewers gave suggestions to the unit on how to achieve the goals set in its research development plan. For example, they proposed actions or issues to be considered in the planning, and asked questions that challenge the unit to ponder the research development from a new perspective. In some cases, the peer reviewers suggested adding development areas to the plan.

# 8 Effects of the coronavirus pandemic

## 8.1 JYU's instructions concerning research activities and travelling during the COVID-19 pandemic

On 16 March 2020, the Finnish government outlined that university facilities must be closed and contact teaching ceased from 18 March to 13 April 2020 in order to prevent the spreading of the coronavirus. Eventually, JYU premises stayed closed until 13 May 2020 and even after that the usage was possible with severe restrictions.

In Mid-March 2020, JYU had proactively adjusted its research activities by giving its first instructions during the COVID-19 pandemic. JYU allowed only a limited number of persons to be present in the JYU premises and thus the majority of the researchers did remote work from 16 March 2020 until end of June 2021 (based on the information in May 2021). Only essential research was allowed to take place on the campus. If the research activities involved test subjects from outside the university, this required the research permission given by the vice rector responsible for research and innovations.

JYU set a maximum number of participants in events and advised to held them primary as remote events. This meant that also the public defences of dissertation were organized with a limited number of audience at the site and the rest of the audience followed the defence online.

In March 2020, JYU made decision on travelling restrictions following instructions by Finnish authorities. JYU instructed to avoid travelling to and from the epidemic areas at the time. In August 2020, JYU adopted so-called traffic light model made by the Finnish Institute for Health and Welfare (THL), where countries were divided into three categories according to the incidence of COVID-19. In line with the THL's instructions, JYU did not restrict travelling to and from countries where the risk of infection was not significantly higher than in Finland. If the infection risk was higher or significantly higher than in Finland, JYU allowed travelling to and from these countries only if a trip was assessed to be critical and essential. Furthermore, persons who arrived from these countries had to go into the 14-day self-quarantine. In March 2020, JYU also decided that it will not receive international visitors (employees, grant researchers, visitors and doctoral students) until 30 June 2020 and in February 2021, JYU extended the restriction to the end of April 2021.

As the Coronavirus situation in Finland and Jyväskylä varied in 2020, authorities and consequently JYU updated the restrictions and recommendations when needed. This, an unavoidable circumstance, may have contributed to complicating planning at the units.

## 8.2 Effects identified by the units

In self-evaluation report, the units were asked to describe the changes the COVID-19 pandemic has caused in research activities, especially international collaboration. The units reported the pandemic influenced research in various ways.

In order to be able to transfer smoothly from contact to online teaching with relatively short notice, teachers allocated more working time to teaching than planned at the expense of

research. Since only essential research was allowed to be conducted and a limited number of persons was allowed to be present at the same time at the JYU premises, the units had to cut down their research activities. All of these together slowed down the progress of research.

Travelling restrictions complicated international research collaboration and internationalization in general. Units were not able to receive visiting researchers and lecturers abroad, hire international researchers according to their plan, or organize conferences. Researcher could not make research visits abroad or attend scientific meetings in order to present their research and to network. On site meetings, including conferences, workshops and meetings with collaborators, were cancelled or replaced with online meetings, which the units saw as a good option, although they did not consider online meetings totally to correspond in-person meetings. For example, one unit reported the absence of spontaneous meetings to be a pity, as it saw these meetings to be fruitful. The pandemic also slowed down research by causing delays in deliveries of goods needed in research.

Preliminary data on publications in 2020 shows that the number of publication stayed at the same level as in previous years (Figure 6a). This suggests that researchers have concentrated on writing during the pandemic. On the other hand, some units reported their concern on the lowered number of submitted research funding applications, which they assumed be due to uncertainty caused by the pandemic.

Some units also were concerned that remote working conditions might cause isolation and increase stress. To mitigate the negative effects on wellbeing, units had started to organize online get-together events.

As positive effects, units mentioned initiation of new research collaborations related to the COVID 19, reduced need to travel, increased use of online communications and increased interest in following communication and developing communication strategy. Many scientific meetings and other events were held online, which were seen to have both drawbacks and benefits. Attending virtual events was ease, did not require travel and also supported sustainable use of environment. These observations are in line with the results of a survey, which asked researchers' experiences with virtual scientific meetings during the pandemic (Remmel, 2021).

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# 10 Terms and definitions

| | |
|---|---|
| Citation count | The total number of citations received since an item was published, up to the date of the last data cut (SciVal). Self-citations included. |
| Citations per publication | The average number of citations that a unit's publications have received (SciVal). |
| Collaboration | The extent to which a unit's publications have international, national, or institutional co-authorship, and single authorship. |
| Coverage | The share of publications produced by a unit, which are indexed in the database (SciVal). |
| Converis | The research information system of the University of Jyväskylä, which contains information on experts, projects, publications and metadata of research data. |
| Field-weighted citation impact | The number of citations received by a unit's publications compares with the average number of citations received by all other similar publications in the data universe (SciVal). 1 = The unit's publications have been cited exactly as would be expected based on the global average for similar publications. >1 = The unit's publications have been cited more than would be expected based on the global average for similar publications. <1 = The unit's publications have been cited less than would be expected based on the global average for similar publication. |
| Four-stage research career model | The four-stage research career model at the Finnish universities (Ministry of Education, 2008). At the JYU, the stages include the following job titles. I = doctoral student (new title 1.3.2021: doctoral researcher), project researcher, research assistant. II = postdoctoral researcher, university teacher (since 2019), research coordinator. III = assistant professor (tenure track), associate professor (tenure track), lecturer, senior lecturer, senior university lecturer (a new title 1.1.2020), senior researcher, academy research fellow. IV = research director, professor, academy professor, visiting professor, professor of practice. |
| Full publication count | Co-authored publications are counted as one publication for each unit, which has contributed to them. Thus, it indicates the number of publications, which include author(s) from an organization. |
| International authorship | An international authorship means that the authors include at least one person affiliated to a non-Finnish organization. |

| | |
|---|---|
| Institutional co-authorship | Institutional co-authorship means that the authors come from JYU. |
| JUFO classification | JUFO is a Finnish classification system for publication channels. It rates publication channels into the following levels: 1 = basic level, 2 = leading level, 3 = highest level, and 0 = publication channels, which do not fulfil the requirements of any level. |
| JYX | JYX is digital repository of the University of Jyväskylä. |
| Metadata | Data describing relevant properties of the research data in question. |
| Nationally co-authored publications | In nationally co-authored publications, all authors are at least from two Finnish organizations. |
| Open access publications | Publications, which are available without any restrictions. Gold open access are identified as fully published articles available from the publisher without charge. That is publishing in open access journals. Green open access means that an article is published in a traditional subscription-based scientific journal and the parallel copy of the article is stored in a freely accessible online archive so called an open access repository. Hybrid (gold) open access refers to publishing in a traditional subscription journal, in which an article is made open access by paying an article publication charge. |
| Output | The number of publications of a unit. |
| Publication type | In Finland, the Ministry of Education and Culture classifies publications into nine main publication types A) Peer-reviewed scientific articles, B) Non-refereed scientific articles, C) Scientific books (monographs), D) Publications intended for professional communities, E) Publications intended for the general public, F) Public artistic and design activities, G) Theses, H) Patents and invention disclosures, and I) Audiovisual material, ICT software. More information on publication types. |
| SAP | Financial and human resources information system |
| SciVal | SciVal is an online bibliometric tool, which can be used to analyses publication output at an individual, group, and institutional level worldwide. SciVal uses the Scopus database from 1996 onwards. |
| Scopus | Scopus is an abstract and citation database. It includes peer-reviewed scientific journals, conference papers, trade publications, book series, and patents (from 5 patent offices) that |

| | |
|---|---|
| | have been assigned an ISSN. The database is updated daily. Publications written in English constitute the majority in Scopus. The coverage of Scopus differs by a discipline. |
| Self-citation | Self-citations are those by which an entity refers to its previous work in new publications (SciVal). |
| Subject area | Publications by the subject classifications that are assigned to the journal in Scopus database, which SciVal uses. A publication channel can be allocated to more than 1 category. See the list of subject areas. |
| Vipunen Reporting Portal | |
| | Vipunen is the education administration's reporting portal in Finland. It contains statistics on e.g. Finnish universities. |
| Year of publication | The year in which the publication was published. |

# Appendices

## Appendix 1. Research personnel

Data on research personnel in years 2018–2020:

1. Number and Full Time Equivalent (FTE) of research personnel
2. The number of grant researchers (the number of grant researcher's agreements)
3. The number of undergraduate (pursuing Bachelor or Master's degree) students
4. The undergraduate student/staff ratio
5. Personnel job titles (FTE)
6. Sex ratio by job titles
7. International personnel by job titles (FTE)

## Appendix 2. Funding

Financial data includes (2018–2020):

1. Budget (i.e., core) funding (€)
2. Supplementary funding in total (€, percentage of total funding (%)) (used funding for the years 2018–2020, granted funding in 2020)
    a. Finnish funding (€)
        i. Academy of Finland
        ii. Business Finland
        iii. Ministry of Education and Culture
        iv. Other public funding (other Ministries, municipalities and other public sector)
        v. Finnish foundations & trusts
        vi. Finnish companies
    b. Foreign funding (€)
        i. EU Structural Funds
        ii. ERC and EU Framework
        iii. Other international funding (other EU funding, foreign foundations, international trusts, international companies, other international funding)
    c. Other supplementary funding (€)

## Appendix 3. Mobility

National and international research visits by the duration in 2018–2020. Data for visits to the unit from Finland was not available.

1. Visits from the unit to Finland and abroad
    a. 1–4 days
    b. At least 5 days, but less than 1 month
    c. 1 month or longer
2. Visits to the unit from abroad
    a. 1–4 days
    b. At least 5 days, but less than 1 month
    c. 1 month or longer

## Appendix 4. Bibliometric analysis

The objective of the bibliometric analysis is to support the evaluation of the implementation of development plan. Bibliometric analysis provides an overview of the publication activity 2018–2020 and the changes that occurred therein, but is not the object of evaluation. Data for 2020 is preliminary.

Bibliometric analysis seeks answers to questions raised in the research development plans:

1. What is the coverage of SciVal database?
2. What is the volume of the publications?
    a. Annual number of publications by publication type
3. Where JYU publishes?
    a. Publication output by Publication Forum (JUFO) levels, journals
4. What is the share of open access publications?
5. What is the publication language (English, Finnish, other languages)?
6. The volume of co-publishing (as a proxy for collaboration)?
    a. Number of publications with national, international, and institutional authorship, single authorship
7. What is the field of science?
    a. Determined based on the subject area used in SciVal database for a scientific journal or conference publication
8. What is the scientific impact?
    a. Citation count, Citation count per publication, Field-weighted citation impact, Co-Citation Percentile Rank (CPR)

## Appendix 5. Self-evaluation report (template)

**Evaluation unit:**
**Date**:

**1. Description of the self-evaluation procedure**

[Instructions: Describe briefly how you have organised the self-evaluation.]

**2. Participants**

[Instructions: Provide the names of the persons involved in the self-evaluation and their job titles.]

**3. Effects of the coronavirus pandemic**

[Has the coronavirus pandemic caused changes in the international collaboration?]

**4. General effects**

[Instructions: What concrete effects the research evaluation, self-evaluation and research development plan have had on, for example

a) unit's research strategy and action plan
b) national and international collaboration
c) actions to facilitate researchers' mobility and career development]

**5. The implementation of development actions**

[Instructions: Describe the development areas and actions, and answer to the following questions for each development action.]

1 What is the status of the development actions (action completed, in progress, in planning phase, on hold)? How far is implementation of development actions?
2 Have you adjusted the original development plan? Answer to those questions, which are appropriate for your development plan.
    a. Have you adjusted development actions? Why and how you have adjusted development actions?
    b. Are there any development actions that you have not initiated or have abandoned altogether? What are the reasons for your decision?
    c. Have you identified or initiated development actions, which are not included in the unit's original development plan? If yes, please describe additional development actions, including their goals and schedule.
3 Are development actions on schedule? If implementation is running ahead of or behind schedule, please describe reasons and provide an updated schedule.
4 Have you achieved the goals, which you set in the development plan? If yes, please name the goals. If not, please describe what the unit will do (or has done) in order to achieve goals?
5 What resources the successful implementation requires?

**6. A sum up list of the development plan**

Table 1. Summary of the development plan.

[Instructions: In the first column, write the names of the development area and development action. In the column "Status", select the status of the development action in the drop-down list and in the column "Adjustments" whether any changes have been made to the original development plan. In the columns "Schedule", enter the original and updated schedule for the development action with a precision of one year and one month (for example, January 2022).]

| Development area & action | Status | Adjustments | Original schedule | Updated schedule |
|---|---|---|---|---|
| | completed / in progress / in planning phase / on hold | Yes / No | | |

## Appendix 6. Participants in the self-evaluation and development day

Persons who participated in the development day are indicated with *.

**Centre for Applied Language Studies**

Mia Halonen, University Researcher*
Mari Honko, Postdoctoral Researcher*
Ari Huhta, Professor*
Petteri Laihonen, Academy Research Fellow*
Tarja Nikula-Jäntti, Professor*
Ulla Richardson, Professor*
Tanja Seppälä, Doctoral Researcher*
Sari Pöyhönen, Professor*

Present only at the development day*:
Jari Ojala, Professor, Vice Dean

**Department of Biological and Environmental Science**

Janne Ihalainen, Head of Department*
Leena Lindström, Professor, Deputy Head, Research and Innovation*
Emily Knott, University Lecturer, Deputy Head, Education*
Jari Ylänne, Professor, Section Head of biosciences
Jouni Taskinen, Professor, Section Head of Natural Resources and Environment
Anssi Lensu, University lecturer, Section Head Natural Resources and Environment*
For future plans: All doctoral students, all academy researchers

**Department of Chemistry**

Evgeny Bulatov, Postdoctoral Researcher
Elina Kalenius, Senior Lecturer
Elina Laurila, University Teacher
Jani Moilanen, Academy Research Fellow
Karoliina Honkala, Professor*
Noora Aho, Doctoral Student

**Department of History and Ethnology**

Pertti Ahonen, Professor, Deputy Head of department (research and innovation)*
Heli Valtonen, Senior Researcher, Head of department*
Piia Einonen, Senior Researcher, Deputy Head of department (education)
Outi Fingerroos, Professor
Pasi Ihalainen, Professor
Petri Karonen, Professor
Jari Ojala, Professor, Vice Dean
Laura Stark, Professor*

Present only at the development day*:
Antero Holmila, Associate Professor
Jari Eilola, University Researcher
Eerika Koskinen-Koivisto, Postdoctoral Researcher
Miikka Voutilainen, Postdoctoral Researcher
Katja Pyötsiä, Doctoral Researcher
Pekka Pietilä, Doctoral Researcher

**Department of Language and Communication Studies**

Nettie Boivin, Associate Professor
Johanna Ennser-Kananen, Academy Research Fellow*
Päivi Iikkanen, University teacher*
Jarmo Jantunen, Professor*
Tommi Jantunen, Professor*
Saara Jäntti, Researcher*
Karita Mård-Miettinen, Professor
Dmitri Leontjev, Postdoctoral Researcher*
Sirpa Leppänen, Professor*
Riikka Nissi, University lecturer
Åsa Palviainen, Professor*
Jari Parkkinen, Doctoral Researcher*
Sari Pietikäinen, Professor
Arja Piirainen-Marsh, Professor*
Marko Siitonen, Associate Professor*
Anu Sivunen, Professor*
Maiju Strömmer, Postdoctoral Researcher*
Turo Uskali, Associate Professor*
Eero Uusiaho, Research assistant

Present only at the development day*:
Mika Lähteenmäki, Head of department
Jari Ojala, Professor, Vice Dean

**Department of Mathematics and Statistics**

Katrin Fässler, Senior Lecturer*
Christel Geiss, Senior Lecturer*
Stefan Geiss, Professor*
Vesa Julin, Associate Professor*
Petri Juutinen, Professor, Vice Head of Department and pedagogical director*
Aapo Kauranen, Postdoctoral Researcher*
Tero Kilpeläinen, Professor, Head of Department*
Pekka Koskela, Professor*
Tuomas Orponen, Assistant Professor*
Mikko Parviainen, Associate Professor*
Tapio Rajala, Associate Professor*
Mikko Salo, Professor*
Matti Vihola, Associate Professor*

Present only at the development day*:
Toni Ikonen, Doctoral Student
Tuomo Äkkinen, University Teacher

**Department of Music, Art and Culture Studies**

Suvi Saarikallio, Vice Head of Department (research)*
Heikki Hanka, Head of Department*
Raine Koskimaa, Professor*
Tuuli Lähdesmäki, Associate Professor*
Petri Toiviainen, Professor*
Comments and suggestions by MUTKU personnel

**Department of Physics**

Ilari Maasilta, Professor, Vice Head of department*
Timo Sajavaara, Professor, Head of department*
Anu Kankainen, Associate Professor*
Heikki Mäntysaari, Postdoctoral Researcher*
Risto Ojajärvi, Doctoral Researcher*

**Department of Social Sciences and Philosophy**

Jarno Hietalahti, Postdoctoral Researcher (Philosophy)*
Sergei Prozorov, Professor (political science)*
Suvi Kouri, Doctoral Researcher (sociology)*
Tiina Silvasti, Professor (social and public policy)*
Tapio Litmanen, Professor (sociology)*
Paula Vasara, Postdoctoral Researcher (social and public policy)*
Tiina Sihto, Postdoctoral Researcher (social and public policy)
Marjo Kuronen, Professor (social work)*

**Faculty of Education and Psychology**

Outi Alakärppä, Mikko Aro, Piia Astikainen, Kaisa Aunola, Maarit Alasuutari, Marja Leena Böök, Petteri Eerola, Janne Fagerlund, Elina Hämäläinen, Jarmo Hämäläinen, Raija Hämäläinen, Noona Kiuru, Katja Kokkinen, Merja Koivula, Jan Kujala, Virpi-Liisa Kykyri, Aarno Laitila*, Paavo Leppänen*, Marja-Kristiina Lerkkanen*, Joni Lämsä, Anne Martin, Miika Marttunen*, Olli Merjovaara, Josephine Moate, Simo Monto, Aimo Naukkarinen, Tiina Nikkola, Miriam Nokia, Piia Näykki, Eija Pakarinen, Markku Penttonen, Satu Perälä-Littunen*, Johanna Rantanen, Katri-Helena Rautiainen, Mika Risku, Niina Rutanen, Anna Rönkä*, Hannu Savolainen, Eija Sevon, Mirja Tarnanen, Minna Torppa, Tuulikki Ukkonen-Mikkola, Mikko Vesisenaho, Tanja Vehkakoski, Jan Wikgren

Present only at the development day*:
Anna-Maija Poikkeus, Raimo Lappalainen; Taru Feldt, Tiina Volanen, Sirpa Eskelä-Haapanen, Leena Halttunen, Juha Holma, Riitta Kesonen, Kaisa Aijanen, Paula Hassinen

**Faculty of Information Technology**

Tuure Tuunanen, Vice Dean of research*
Pekka Abrahamsson, Research division leader
Timo Hämäläinen, Research division leader
Tommi Kärkkäinen, Research division leader*
Timo Tiihonen, Research division leader
Timo Hämälänen (SCSP), Research group leader
Ville Isomöttönen (CER), Research group leader
Tuomo Kujala (COG), Research group leader*
Tommi Kärkkäinen (Humble), Research group leader
Markus Salo (CPSS), Research group leader
Mikko Siponen (ECSE), Research group leader
Vagan Terziyan (COIN), Research group leader
In addition, a varying number of members from each research group participated in the research self-evaluation.

Present only at the development day*:
Pasi Tyrväinen, Dean
Nina Pekkala, Coordinator

**Faculty of Sport and Health Sciences**

List available only for the participant at the development day:
Janne Avela, Professor*
Harri Piitulainen, Academy Research Fellow*
Ari Heinonen, Professor*
Juha Hulmi, Associate professor*
Taija Juutinen, Professor*
Katja Kokko, Research Director*
Sami Kokko, Associate Professor*
Eija Laakkonen, Academy Research Fellow*
Maarit Lehti, Senior Researcher, Laboratory Manager *
Taru Lintunen, Professor*
Taina Rantanen, Professor*
Arja Sääkslahti, Associate Professor*
Ritva Sakari, Education Coordinator*
Sarianna Sipilä, Professor, Vice Dean*

**Finnish Institute for Educational Research**

Melina Aarnikoivu, Postdoctoral Researcher
Hannu Heikkinen, Professor
Päivi Häkkinen, Professor, Vice Director
Jaana Kettunen, Vice Director
Joonas Mannonen, Project Researcher
Tero Pelkonen, Application Designer
Juhani Rautopuro, Research Professor
Taina Saarinen, Research Professor
Taru Siekkinen, Postdoctoral researcher
Matti Taajamo, Senior Researcher
Päivi Tynjälä, Professor
Raimo Vuorinen, Project Manager
Jussi Välimaa, Professor, Director of the Institute

**Jyväskylä University School of Business and Economics**

Vilma Luoma-aho, TKR Professor, Vice Dean, Research, Corporate communication*
Mika Haapanen, TKR Associate Professor, Economics*
Jutta Viinikainen, TKR Associate Professor, Economics*
Antti Rautiainen, TKR Associate Professor, Accounting*
Juha Munnukka, TKR Senior Researcher, Marketing*
Juha Kansikas, TKR Senior Lecturer, Strategy and Entrepreneurship*
Marjo Siltaoja, TKR Associate Professor, Leadership*
Tommi Auvinen, TKR Senior Lecturer, Leadership*
Kirsi Murtosaari, TKR, Head of faculty administration*
Niina Simanainen, TKR, Head of student and academic affairs*
Mika Skippari, TKR University Researcher, doctoral school coordinator*
Hanna-Leena Pesonen, Professor, Dean*
Anna-Maija Lämsä, Professor, Vice Dean, Education*
Horacova Julie, Doctoral Student, Marketing*
Irene Kuhmonen, Doctoral Student, Corporate environmental management*
Dinesh Poudel, Doctoral Student, Leadership*
Jussi Leskinen, Doctoral Student, Economics*

**Kokkola University Consortium Chydenius**

Toni Varila, Postdoctoral Researcher
Pekka Tynjälä, Senior Researcher
Jouni Kaipainen, Senior Researcher
Sanna Laine, Project Researcher*
Essi Korkeaniemi, University Teacher*
Päivi Perkkilä, University lecturer*
Heidi Harju-Luukkainen, Professor*
Aila-Leena Matthies, Professor*

Present only at the development day*:
Marko Aittola, Director
Ulla Lassi, Professor
Olli Rosenqvist, University Researcher

## Appendix 7. Dates for development day

Dates for development day.

| Evaluation unit | Date | Time |
|---|---|---|
| BIOENV | Wed 31.3. | 10.00–12.00 |
| CALS | Tue 30.3. | 10.00–12.00 |
| Chem | Thur 1.4. | 10.00–12.00 |
| EDUPSY & FIER | Tue 6.4. | 10.00–12.00 |
| Hela | Thur 25.3. | 10.00–12.00 |
| IT | Fri 26.3. | 14.00–16.00 |
| JSBE | Mon 29.3. | 10.00–12.00 |
| KYC | Tue 30.3. | 14.00–16.00 |
| LaCos | Mon 29.3. | 14.00–16.00 |
| Maths | Tue 30.3. | 14.00–16.00 |
| Mutku | Tue 6.4. | 14.00–16.00 |
| Phys | Wed 7.4. | 14.15–16.15 |
| Sports | Mon 29.3. | 10.00–12.00 |
| YFI | Mon 29.3. | 10.00–12.00 |

## Appendix 8. Peer-review statement (template)

The main objective of the internal peer review is improvement of the research development plan by giving the unit constructive feedback. Based on the discussion with the unit's representatives (about 2 h), unit's self-evaluation report, background material and updated development plan, the peer reviewers write a joint statement of their observations and recommendations. The peer reviewers will not grade or rank the evaluation units. The deadline of the statement is April 9th. Evaluation unit will receive the statement, on the basis of which it will modify its development plan. For further information on the internal peer review, please see chapter 3.6. in instructions.

**Evaluation unit:**
**Peer reviewers:**
**Date:**

**1. Participants**

[Instructions: Provide the names and job titles of unit's persons participated in the development day.]

**2. Feedback on the development plan and its implementation**

**2.1. Summary**

[Instructions: Please provide a short summary on key recommendations and observations regarding the development plan. You can make recommendations on how the development plan could be further developed, e.g. by including new development areas and actions, to maintain an encouraging and facilitating environment for research.]

**2.2. Development area**

[Instructions: Please give comments on the feasibility, strengths and foreseeable challenges of the development action in relation to the goals. That is, whether the development action has the potential to achieve its goals. You can also make recommendations on how the development plan could be further developed, e.g. by including new development actions or by modifying the development actions already in the development plan to maintain an encouraging and facilitating environment for research.]

## Appendix 9. Abbreviations

| | |
|---|---|
| BIOENV | Department of Biological and Environmental Science |
| CALS | Centre for Applied Language Studies |
| Chem | Department of Chemistry |
| EDUPSY | Faculty of Education and Psychology |
| FIER | Finnish Institute for Educational Research |
| Hela | Department of History and Ethnology |
| HYTK | Faculty of Humanities and Social Sciences |
| IT | Faculty of Information Technology |
| JSBE | Jyväskylä University School of Business and Economics |
| KYC | Kokkola University Consortium Chydenius |
| LaCos | Department of Language and Communication Studies |
| Maths | Department of Mathematics and Statistics |
| MLTK | Faculty of Mathematics and Science |
| Mutku | Department of Music, Art and Culture Studies |
| Phys | Department of Physics |
| Sports | Faculty of Sport and Health Sciences |
| YFI | Department of Social Sciences and Philosophy |