



**PBL Future work report 1: Preliminary findings of the staff survey**

*Presentation of frequencies on faculty level from the staff survey*

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# **PBL Future Work Report 1:**

## **Preliminary findings of the staff survey Presentation of frequencies on faculty level**



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The study is a part of the PBL-future project which is backed by Aalborg University strategic funds. Additional contributions for the report was given by the Aalborg UNESCO PBL center



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AALBORG UNIVERSITY

• Aalborg Centre for Problem Based Learning  
• in Engineering Science and Sustainability  
• under the auspices of UNESCO

## PBL Future Contributors

The overall goal for PBL Future research project is to develop research based directions for problem- and project-based learning (PBL) in a Digital Age. This project will re-conceptualise how PBL could operate in new formats, based on the core principles of PBL, while exploring and developing new digital approaches that operate in and open up for new hybrid PBL learning models. An important goal of the project is to have a high degree of global and local impact. The ambition of the project is that AAU will be among the top-five institutions in the global PBL ranking.

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# 1. INTRODUCTION

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## PBL-Future

PBL Future is a research collaboration across faculties at Aalborg University with the aim of developing research-based directions for problem- and project-based learning (PBL) in a digital age.

This is an important enterprise as:

- the AAU model for PBL remains a world acclaimed, radical pedagogical innovation;
- AAU remains at the international forefront in developing PBL;
- students develop PBL competencies that are relevant in a digital age.

This project will re-conceptualise how PBL could be interpreted and operate in new formats, based on the core principles of PBL, while exploring and developing new digital approaches that operate in and open up for new hybrid PBL learning models. This will be achieved by setting a research agenda for PBL in a digital age that will attract international attention as new directions for more student-centred learning is a global need.

The PBL-future project consists of 5 sub-projects:

Baseline study: PBL competences – common baseline study and future directions

Subproject 1: Student centred problem design

Subproject 2: Emerging PBL Collaboration Skills for a Digital Age

Subproject 3: Strengthening PBL competence development of individual students

Subproject 4: Towards a flipped semester PBL approach

The baseline study is meant to deliver broad insights into PBL at Aalborg University, creating a point of reference or state-of-the-art of the curricula for the other projects. In the baseline study, questionnaires have been sent out to all academic staff and all students in May, 2018. In this report the staff questionnaire will be presented.

## Report Structure

This report is meant to introduce the staff questionnaire of the baseline study of the PBL-future project with a focus on preliminary findings on the differences between the faculties of AAU. The first chapter describes the method for the questionnaire and the data analysis presented in this report. The rest of the report structure is based on the batteries of questions included in the questionnaire. It is organized into 2 overarching themes, the students' learning and the educational framework at AAU. The framework of these two overarching themes were not a part of the questionnaire, but became obvious during the data analysis.

Chapters 3, 4, 5 and 6 focus on the students' learning looking at:

- How important they find a number of competencies for the students' future work
- Their opinions on aspects of the students learning in group-based project work.
- How well certain activities help make the students ready for their future work.
- How much self-determination the students have in a number of aspects pertaining to project work.

Chapters 7, 8 and 9 look at the staff members' opinions on the educational framework of AAU, looking particularly at:

- Perceptions about project supervision.
- Perceptions about projects and courses.
- What should be prioritized in the development of the AAU model of the future.

The focus for this report is to present descriptive frequencies from each Faculty. All chapters are introduced with an overview of the data, delivering transparency and presenting all respondents at AAU followed by data for each faculty at AAU. The purpose of the report is to present the results, and give the reader a short explanation of the reasoning behind the questions, but will not delve into concrete analyses of the differences between faculties or other variables. The report is meant to give the reader a chance to look at the particular faculty staffs' profile.

The order of all sub-variables in the figures presented in each chapter will be the same across all figures, following the structure from all AAU respondents which should allow for easier comparisons between each faculty. There are no measures of statistical significance reported and the report is meant mostly as a brief presentation of the data and to give an overview of the preliminary findings of this part of the baseline study. The detailed and deeper analyses will be presented in articles.



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## 2. METHOD

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### Baseline

The intention with the baseline study was to create a state-of-the-art for PBL at Aalborg University – or an information base to compare to after a development process. As AAU faces new developments in the PBL model, the PBL-future decided to draw a baseline to compare with in the future.

In order to create a baseline, a literature study of existing studies form the basis together with what kind of changes AAU expect to face in the future. Here the AAU strategy emphasize implementation of PBL progressive competencies together with integration of digital competencies. This will impact the formal curriculum and there are ideas for creating new relations between the traditional taught discipline courses and the projects as digital teaching and learning will allow for integrating a just-in-time learning principle.

As part of the baseline, we would like to have three aspects covered: the formal curriculum, the view of academic staff and the view of students. From all three perspectives, we have focused on:

- The PBL competencies as the added value of a PBL curriculum as this is the core common research topic for the entire PBL-future project.
- The formal curriculum framing students' learning process in PBL combined with staff and student view on PBL elements in the curriculum.
- The priority of elements in a future formal PBL curriculum model

For these purposes, two surveys were constructed, overlapping on number of topics, but adapted to the academic staff and students. A content analyses of the formal curriculum of several programs was also conducted.

### Survey construction

The survey was constructed in a cooperation with participants from the different subprojects from PBL-Future and importantly the PBL-future participants represents all faculties at AAU. Each subproject brought expertise on different aspects of the survey and the cooperation ensured a level of validation of the questions – partly from a theoretical perspective and partly during the pilot testing phase. These collaborations among the subprojects with participants from all faculties with their different insights ensured that the specific formulations and subjects touched upon by the survey were interesting, relevant and pertained to the state-of-the-art in their specific theoretical

subfield. Colleagues outside the PBL-Future project also contributed in this phase with input to the questionnaire.

The questionnaire was constructed in SurveyXact and sent out in both a Danish and English version. Translation of the questionnaire was conducted with outside consultation as to the cultural connotations of specific words and phrases as well as to ensure that the overall message of each variable was as precise as possible. At any time while answering the questionnaire the respondent can change language.

## Distribution

The questionnaire was sent out through staff e-mails and distributed to all scientific and teaching personnel at AAU. The list of emails was obtained with the help of the HR specialist center at Aalborg University. Distribution was done through SurveyXact. Reminders were sent out at appropriate intervals and data collection took two and a half months.

## Participant filtering and response rate

The questionnaire was sent out to 2545 staff members in total. Responses were received from 1159, giving us a total response rate of 45,5%. Of the responses 1012 gave a complete response and 147 a partial.

		Full response	Partial response
Entire population	2545		
Respondents	1159	1012	147
Respondents <i>without</i> teaching the last 4 years	102		
Respondents <i>with</i> teaching during the last 4 years	1057	910	147

Table 1: Population and response rate

One concern regarding the respondents was the possibility of staff in the list of emails who were not involved in teaching. This problem was highlighted by the HR specialist who provided the list who remarked that it was not possible for him to filter based on concrete teaching or supervision involvement. To deal with this problem the first question of the questionnaire was set up as a filter, ensuring that employees who have not engaged in teaching or supervision of students recently do not influence the data on the basis of experiences deemed outdated. The question read: *"Have you taught or supervised students within the last 4 years?"* and if the respondent responded *"no"* then

they were taken to the very last page of the questionnaire, thanking them for their interest and participation. In creating such a filter, a cutoff point has to be selected, a period of time within which the employee must have engaged in the particular activities to qualify their experiences as recent enough. The need for such a filter comes from a desire to ensure that the data is based on experience with current AAU learning environments and a cutoff value like this one will naturally always be the subject of arbitrary and subjective assessment. Whether a longer or shorter period should have been chosen is up for discussion. Our approach is to provide transparency of the process and welcome criticism and disagreement of the period. It could also be argued that other segments of the staff should have been involved, including those not in direct contact with students, but for our focus we deemed this an appropriate division.

The dataset that this analysis is based upon is therefore already filtered, cutting away 102 respondents who acknowledged that they had not engaged in teaching or student supervision in the last 4 years. Of these 1057 responses there are 147 partial and 910 complete.

## Background variables

Included in the questionnaire were several questions directed towards the respondents' background, asking about their educational background, whether they had obtained a degree from Aalborg University and what educational background their parents had. Several background variables were also obtained along with the email list from HR: gender, age, position and what faculty at AAU they work for. Tables with overview of these variables are presented in this chapter.

### Educational background

Educational background	Master's	PhD	Other:
<b>N</b>	221	653	30
<b>%</b>	24.4%	72.2%	3.3%

**Table 2: Educational background (N: 904)**

72,2 % of the respondents do have a PhD degree. Since the 90's, a PhD has been a requirement and it is among the elder part of the academic staff and part-time staff that lack of PhD is to be found.

## AAU educational background

Have you completed an education at Aalborg University?	Yes	No
<b>N</b>	508	387
<b>%</b>	56.8%	43.2%

**Table 3: Percentage of staff members educated at AAU (N: 895)**

Out of the respondents 56,8% are educated at AAU. This is a rather high percentage and can be due to the fact that AAU is a relatively young university located in the periphery of the country, so it has taken time to recruit academic staff internationally and nationally.

## Parents education

Does one or both of your parents have educational degrees from higher educational institutions?	Yes, both	Yes, one of them	No
<b>N</b>	179	194	530
<b>%</b>	19.8%	21.5%	58.7%

**Table 4: Parents education (N: 903)**

AAU has become known as a university for first-generation academics. As there is a high percentage educated at AAU, it is also expectable to find a rather high percentage of first-generation academics among the respondents.

## Gender

Population						Female		Male			
<b>N</b>						396		661			
<b>%</b>						37.5%		62.5%			
Cross faculty		Engineering		Health		HUM		Social Sciences		TECH	
Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
61.7%	38.3%	19.0%	81.0%	40.0%	60.0%	47.5%	52.5%	38.8%	61.2%	34.2%	65.8%

**Table 5: Gender (N: 1057)**

The distribution of male and female staff doesn't vary much across faculties with the exception of a relative underrepresentation in the faculty of engineering and an overrepresentation in cross faculty department staff

## Age

In our dataset the age of the respondents ranges from 24 to 77 years old with a median of 44, a mean score of 45.45 and a standard deviation of 12.5 years.

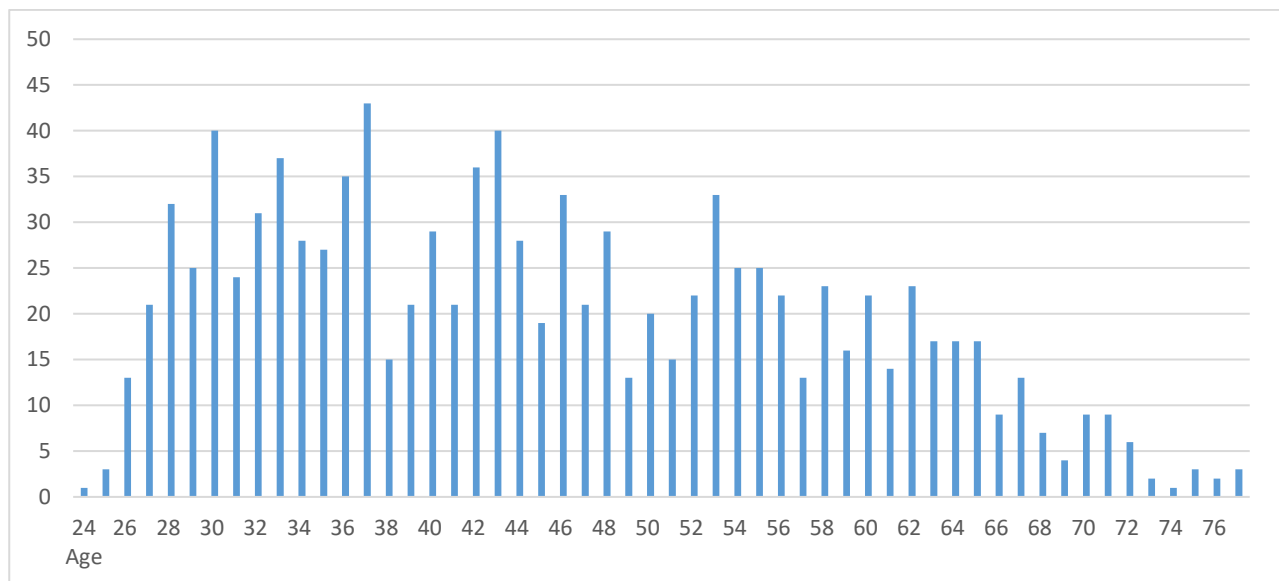


Figure 1: Age (N: 1057)

## Position

	N	%
Associate professor	367	34.7%
PhD fellow	149	14.1%
Assistant professor	118	11.2%
Professor	93	8.8%
External lecturer	87	8.2%
Research assistant	59	5.6%
Post.Doc.	49	4.6%
Clinical lector	29	2.7%
Professor WSR	22	2.1%
Research associate	22	2.1%
Teaching Associate Professor	17	1.6%
Clinical Professor	13	1.2%
Teaching assistant	12	1.1%
Other	20	1.9%

Table 6: Position (N: 1057)

## Faculty

	Cross faculty departments	Engineering	Health	HUM	Social Sciences	TECH
N	154	247	140	99	183	234
%	14.6%	23.4%	13.2%	9.4%	17.3%	22.1%

**Table 7: Faculty (N: 1057)**

All staff members in the cross faculty departments come from the department of Culture & global studies (N=91) and the department of learning and philosophy (N=63).

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## 3. COMPETENCIES

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One of the new curriculum developments at AAU will be the implementation of progressive PBL competencies throughout the entire curriculum from first year to graduation. During 2019, the study boards are going to formulate these competencies explicitly in the curriculum. The framework for formulating PBL competencies is that there should be formulated a progression within four main areas of the PBL competencies: problem-orientation, project-organisation, interpersonal communication and collaboration and metacognitive competencies with the ability to reflect and learn from existing experiences. This framework has been developed later than the list of competencies which we have developed for this question.

To formulate PBL competencies explicitly will be something new – both in the formal curricula but also for academic staff and students in their understanding of relevant competencies. AAU staff and students have claimed that they have learned collaboration, project management etc. Recent study on engineering students and engineering graduates verify that graduates from AAU do seem to have a higher self-efficacy in their teamwork, collaboration, project management and social competencies (Kolmos and Koretke, 2016).

In this study we have asked the question to academic staff how important they think particular competencies are for students' future work life. The idea with this formulation was to get an answer indirectly for which competencies the staff found would be important also in the curriculum. In the questionnaire this competency question was split into two lists of 13 variable to which the respondent had to answer on a 5-point scale ranging from "not at all important" to "Extremely important".

In general, the competence concept is very difficult and many organisations have formulated lists of competences like the UNESCO competency framework (UNESCO, 2016) and the OECD competency (OECD, 2014; UNESCO, 2016). The list of variable in this question is developed with inspiration from the 21<sup>st</sup> century, UNESCO and OECD competence framework. These three sources have given inspiration in combination with a list of competencies from the PROCEED-2-Work project which has been well tested in previous studies (Kolmos and Bylov, 2016).

Furthermore, the participants from the other subprojects in the PBL-Future project were also encouraged to expand the list. After compilation, the full list was first shortened to avoid categories with too much overlap and afterwards, on the basis of a discussion on what would be most vital to look into and theoretically interesting, further shortened.

The different inspiration sources together with colleagues' response resulted in a very long list of wanted/needed competencies that encapsulates all educational programs at AAU. With respect to the respondents time a list was compiled with the objective of using formulations that were generic

enough to span most educations, not be specific and long enough as to discourage the respondents from continuing the questionnaire or made to feel that the categories were altogether irrelevant for their particular field, while still encapsulating most aspects of their students' competencies.

As already explained in the introduction, the structure of the analyses firstly showing the frequency of the answers to the question. The variables have been sorted according to "extremely" important and this order will be used also in presenting the following responses per faculty. We have decided to present both tables and figures to present most transparent data as the figures represent percentage-wise distribution.

Across all the faculties it is notable that the academic staff find PBL competencies such as problem-solving, critical thinking, problem analysis, teamwork and communication as the extremely important for students' later work life. Disciplinary knowledge is at this general level prioritized as the sixth most important. What is considered as less important is design, management, business knowledge, global contexts and sustainability. These priorities from academic staff across the faculties are more or less the same when looking at both very important and extremely important together.

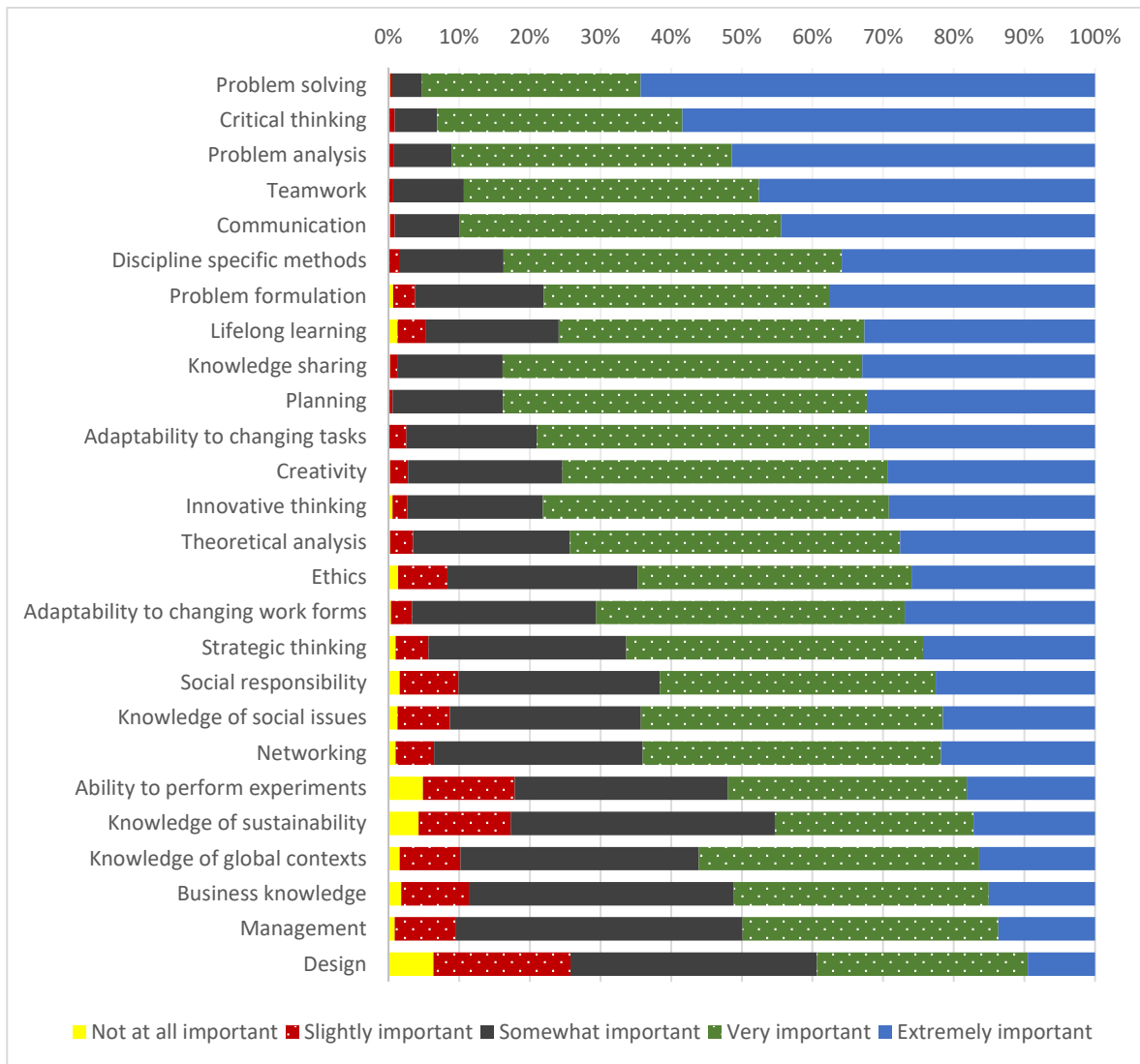
The general trend among academic staff across faculties is clearly that there is an understanding that the PBL competencies are important whereas the societal context such as sustainability, global context, business and management are less prioritized. Design has the lowest priority.

The respondents were asked: Please indicate how important you think the following competencies are for the student's future work?



	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Problem solving	2	3	40	293	610
Critical thinking	1	7	54	312	525
Problem analysis	1	6	73	357	463
Teamwork	0	6	90	377	429
Communication	2	6	82	410	400
Discipline specific methods	1	13	140	453	339
Problem formulation	6	28	164	363	339
Lifelong learning	12	38	177	408	308
Knowledge sharing	2	9	135	460	298
Planning	1	4	141	464	291
Adaptability to changing tasks	0	23	166	425	288
Creativity	2	24	207	435	278
Innovative thinking	5	19	173	441	263
Theoretical analysis	2	31	210	442	261
Ethics	13	66	255	367	246
Adaptability to changing work forms	3	27	235	394	243
Strategic thinking	9	42	252	378	219
Social responsibility	15	79	270	370	214
Knowledge of social issues	12	70	255	403	203
Networking	9	49	265	379	196
Ability to perform experiments	46	123	286	320	172
Knowledge of sustainability	40	123	352	265	162
Knowledge of global contexts	15	81	319	375	155
Business knowledge	17	91	356	342	143
Management	8	78	364	325	123
Design	60	183	329	281	90

**Table 8: Answer to question** *Please indicate how important you think the following competencies are for the student's future work?* **All respondents (N: 898 – 949)**

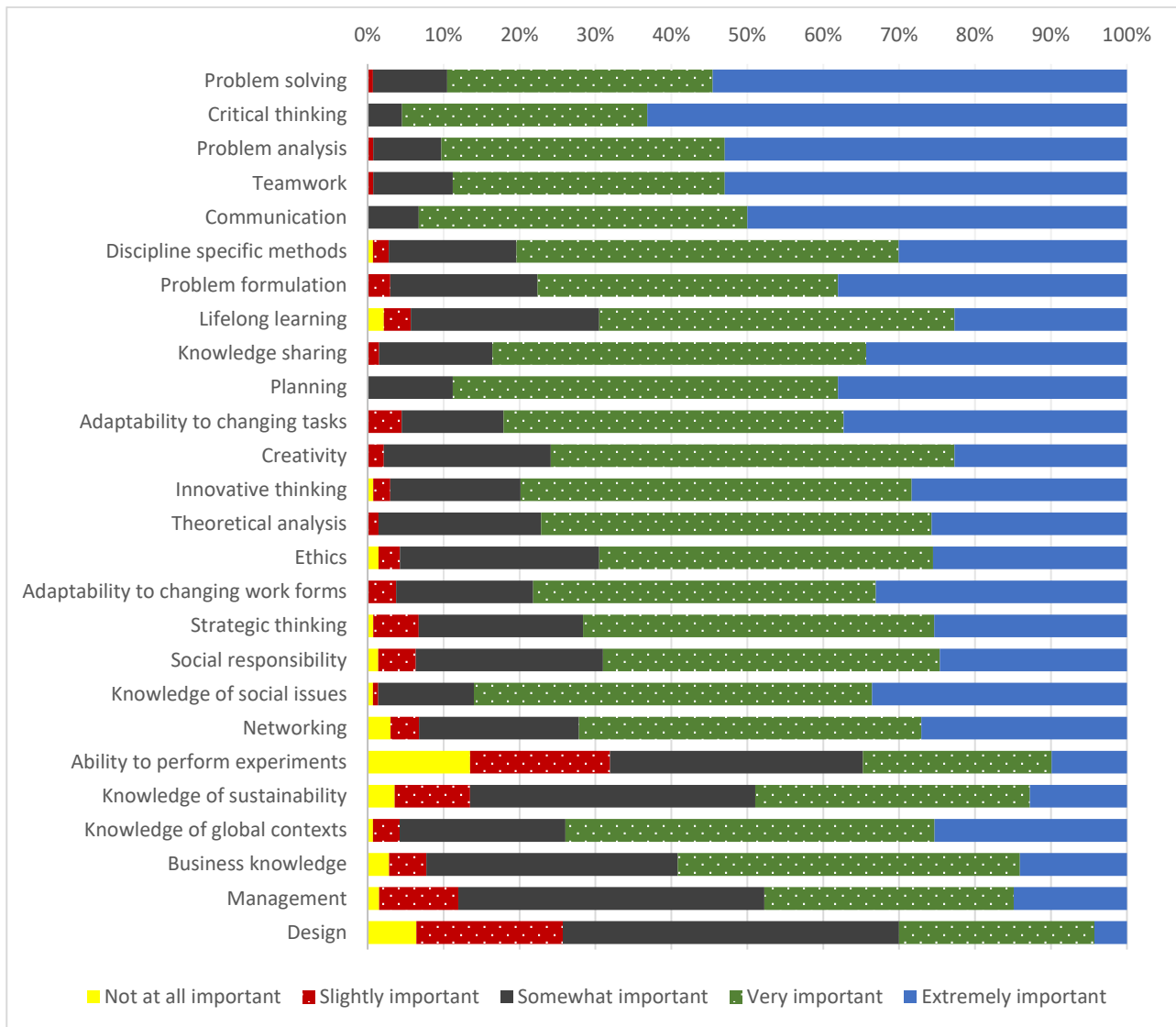


**Figure 2: Answer to question:** *Please indicate how important you think the following competencies are for the student's future work?* All respondents (N: 898 – 949).

## Cross faculty departments

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Problem solving	0	1	14	50	78
Critical thinking	0	0	6	43	84
Problem analysis	0	1	12	50	71
Teamwork	0	1	14	48	71
Communication	0	0	9	58	67
Discipline specific methods	1	3	24	72	43
Problem formulation	0	4	26	53	51
Lifelong learning	3	5	35	66	32
Knowledge sharing	0	2	20	66	46
Planning	0	0	15	68	51
Adaptability to changing tasks	0	6	18	60	50
Creativity	0	3	31	75	32
Innovative thinking	1	3	23	69	38
Theoretical analysis	0	2	30	72	36
Ethics	2	4	37	62	36
Adaptability to changing work forms	0	5	24	60	44
Strategic thinking	1	8	29	62	34
Social responsibility	2	7	35	63	35
Knowledge of social issues	1	1	18	75	48
Networking	4	5	28	60	36
Ability to perform experiments	19	26	47	35	14
Knowledge of sustainability	5	14	53	51	18
Knowledge of global contexts	1	5	31	69	36
Business knowledge	4	7	47	64	20
Management	2	14	54	44	20
Design	9	27	62	36	6

**Table 9: Answer to question: Please indicate how important you think the following competencies are for the student's future work? Cross faculty departments (N: 133 – 143)**

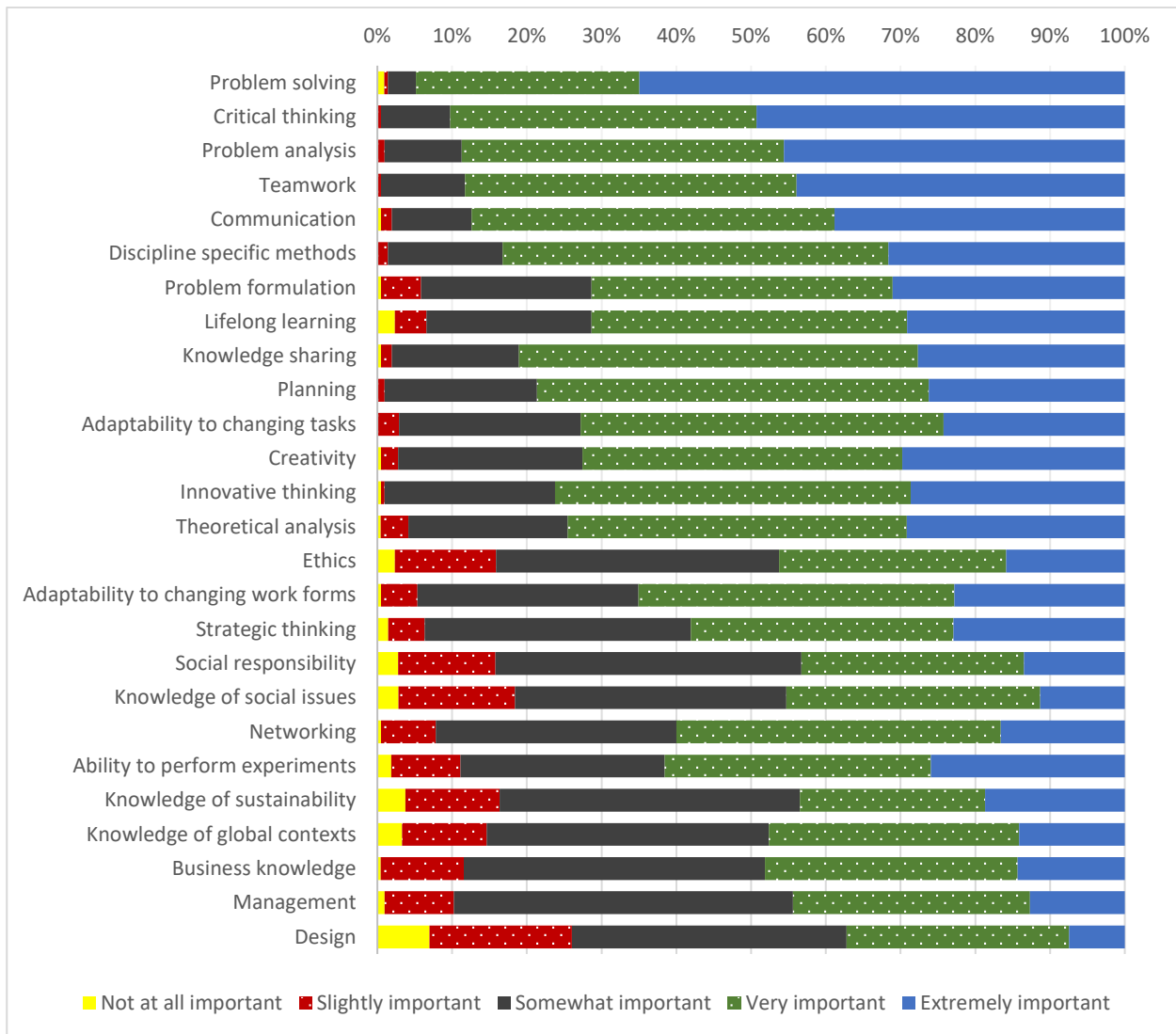


**Figure 3: Answer to question: Please indicate how important you think the following competencies are for the student's future work? Cross faculty departments (N: 133 – 143).**

## Engineering

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Problem solving	2	1	8	64	139
Critical thinking	0	1	19	84	101
Problem analysis	0	2	21	88	93
Teamwork	0	1	23	91	90
Communication	1	3	22	100	80
Discipline specific methods	0	3	33	111	68
Problem formulation	1	11	47	83	64
Lifelong learning	5	9	47	90	62
Knowledge sharing	1	3	35	110	57
Planning	0	2	42	108	54
Adaptability to changing tasks	0	6	50	100	50
Creativity	1	5	53	92	64
Innovative thinking	1	1	47	98	59
Theoretical analysis	1	8	46	98	63
Ethics	5	29	81	65	34
Adaptability to changing work forms	1	10	61	87	47
Strategic thinking	3	10	73	72	47
Social responsibility	6	28	88	64	29
Knowledge of social issues	6	33	77	72	24
Networking	1	15	66	89	34
Ability to perform experiments	4	20	59	77	56
Knowledge of sustainability	8	27	86	53	40
Knowledge of global contexts	7	24	80	71	30
Business knowledge	1	24	87	73	31
Management	2	19	93	65	26
Design	15	41	79	64	16

**Table 10: Answer to question: Please indicate how important you think the following competencies are for the student's future work? Engineering (N: 204 - 216)**

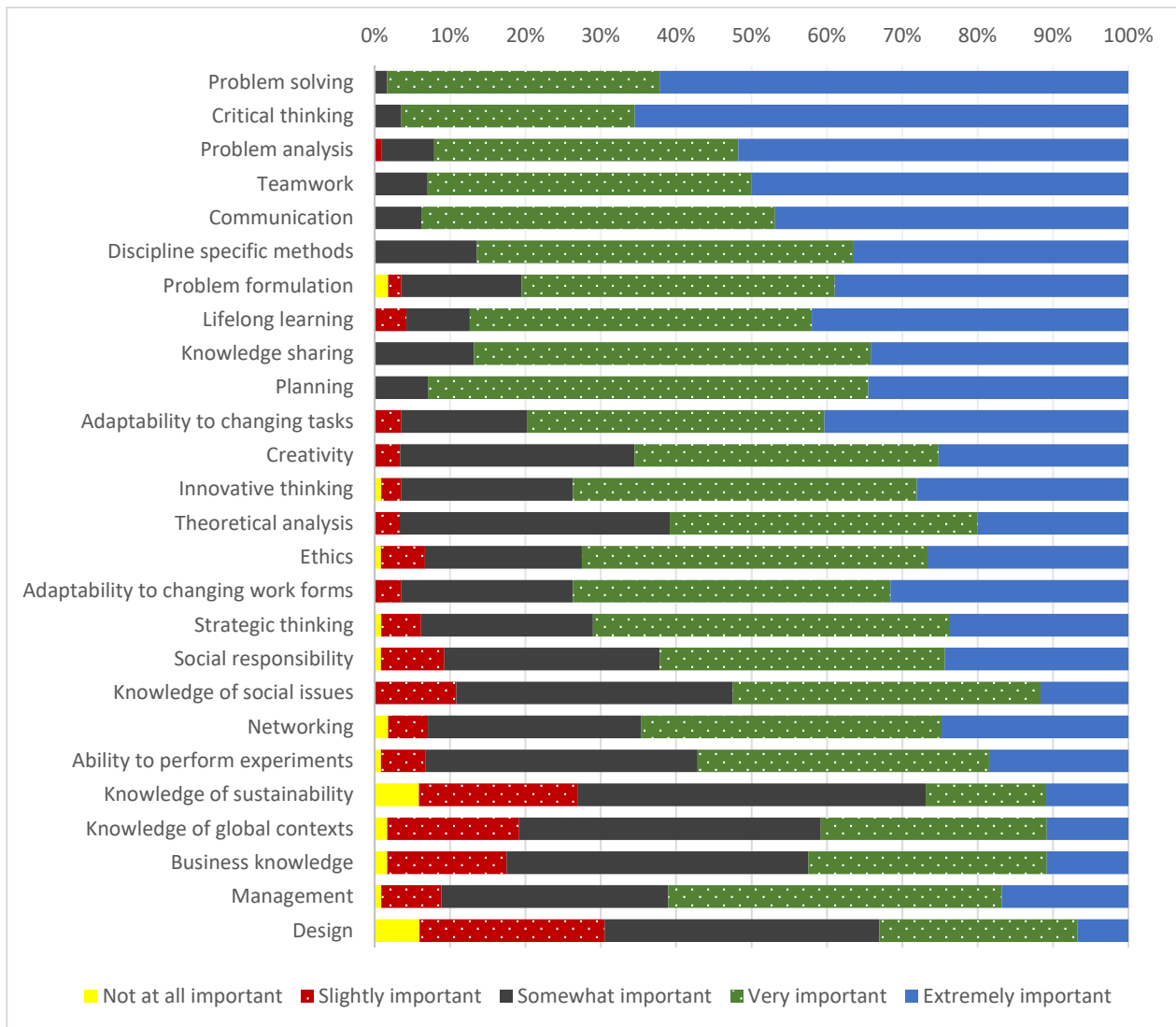


**Figure 4: Answer to question: Please indicate how important you think the following competencies are for the student's future work? Engineering (N: 204 - 216)**

## Health

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Problem solving	0	0	2	43	74
Critical thinking	0	0	4	35	74
Problem analysis	0	1	8	46	59
Teamwork	0	0	8	49	57
Communication	0	0	7	53	53
Discipline specific methods	0	0	16	59	43
Problem formulation	2	2	18	47	44
Lifelong learning	0	5	10	54	50
Knowledge sharing	0	0	15	60	39
Planning	0	0	8	66	39
Adaptability to changing tasks	0	4	19	45	46
Creativity	0	4	37	48	30
Innovative thinking	1	3	26	52	32
Theoretical analysis	0	4	43	49	24
Ethics	1	7	25	55	32
Adaptability to changing work forms	0	4	26	48	36
Strategic thinking	1	6	26	54	27
Social responsibility	1	10	34	45	29
Knowledge of social issues	0	13	44	49	14
Networking	2	6	32	45	28
Ability to perform experiments	1	7	43	46	22
Knowledge of sustainability	7	25	55	19	13
Knowledge of global contexts	2	21	48	36	13
Business knowledge	2	19	48	38	13
Management	1	9	34	50	19
Design	7	29	43	31	8

**Table 11: Answer to question: Please indicate how important you think the following competencies are for the student's future work? Health (N: 113 - 120)**



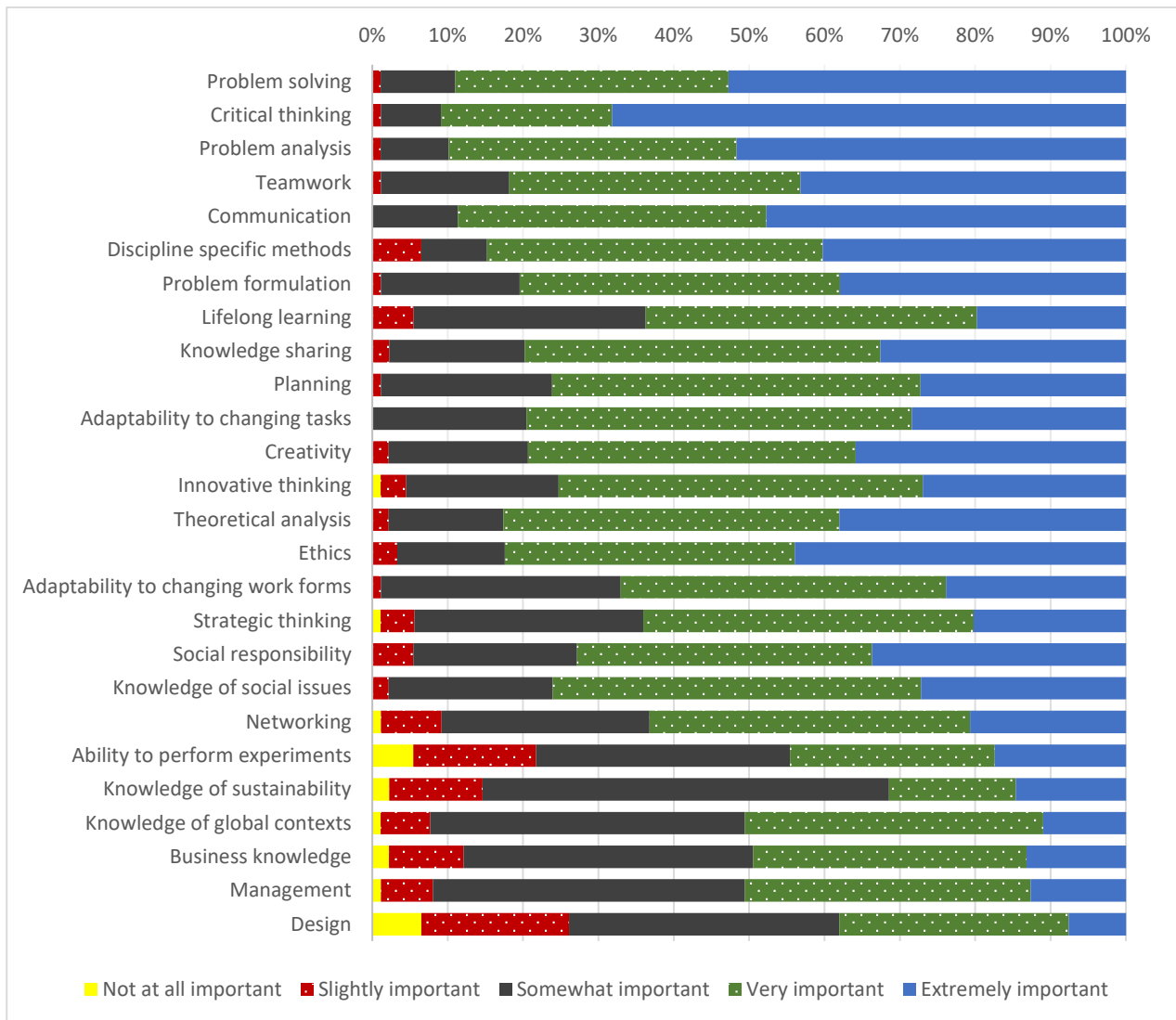
**Figure 5: Answer to question:** *Please indicate how important you think the following competencies are for the student's future work? Health (N: 113 - 120).*



## HUM

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Problem solving	0	1	9	33	48
Critical thinking	0	1	7	20	60
Problem analysis	0	1	8	34	46
Teamwork	0	1	15	34	38
Communication	0	0	10	36	42
Discipline specific methods	0	6	8	41	37
Problem formulation	0	1	16	37	33
Lifelong learning	0	5	28	40	18
Knowledge sharing	0	2	16	42	29
Planning	0	1	20	43	24
Adaptability to changing tasks	0	0	18	45	25
Creativity	0	2	17	40	33
Innovative thinking	1	3	18	43	24
Theoretical analysis	0	2	14	41	35
Ethics	0	3	13	35	40
Adaptability to changing work forms	0	1	28	38	21
Strategic thinking	1	4	27	39	18
Social responsibility	0	5	20	36	31
Knowledge of social issues	0	2	20	45	25
Networking	1	7	24	37	18
Ability to perform experiments	5	15	31	25	16
Knowledge of sustainability	2	11	48	15	13
Knowledge of global contexts	1	6	38	36	10
Business knowledge	2	9	35	33	12
Management	1	6	36	33	11
Design	6	18	33	28	7

**Table 12: Answer to question:** *Please indicate how important you think the following competencies are for the student's future work?* HUM (N: 87 - 92).

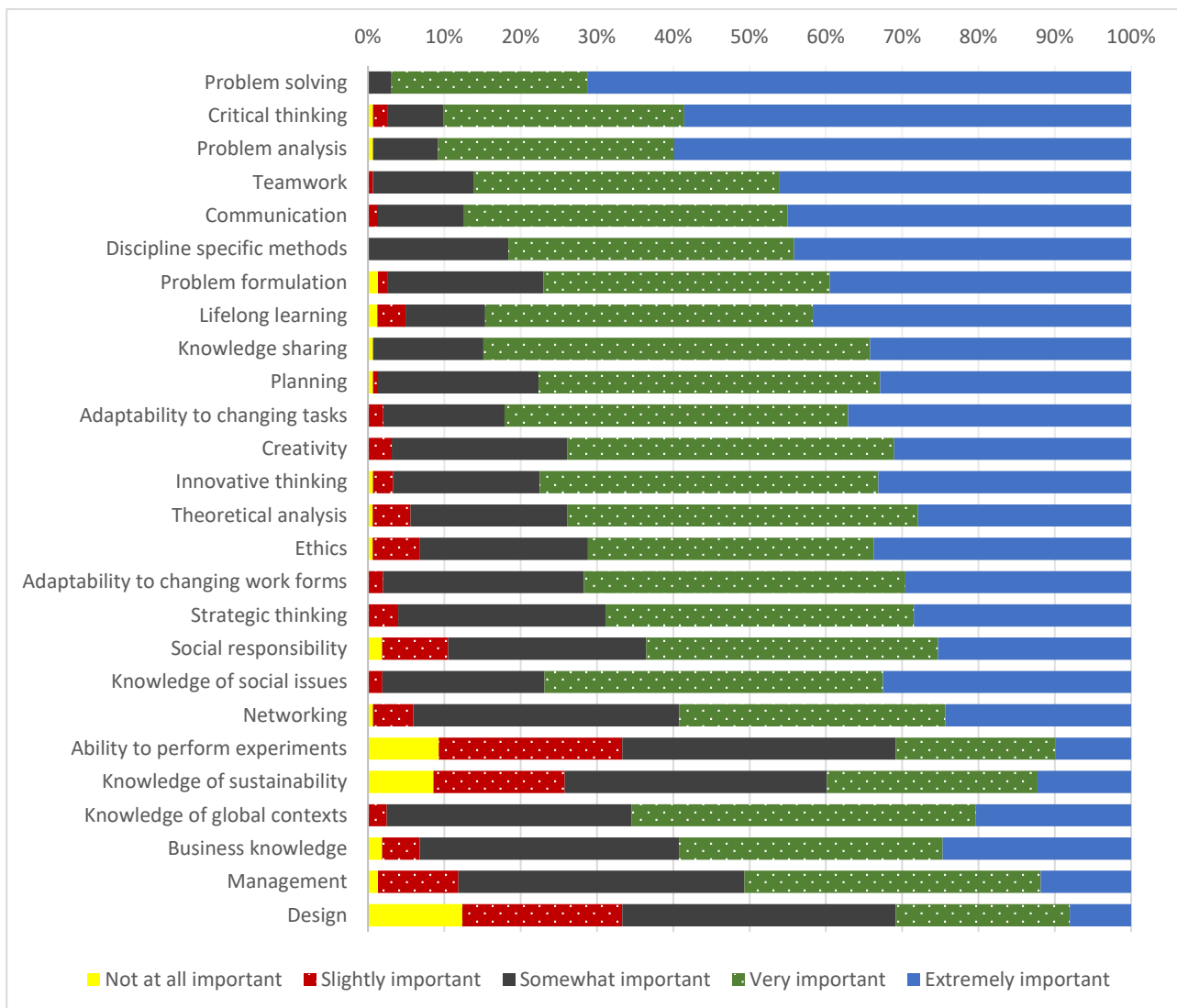


**Figure 6: Answer to question:** *Please indicate how important you think the following competencies are for the student's future work?* HUM (N: 87 - 92).

## Social Sciences

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Problem solving	0	0	5	42	116
Critical thinking	1	3	11	48	89
Problem analysis	1	0	13	47	91
Teamwork	0	1	20	61	70
Communication	0	2	17	64	68
Discipline specific methods	0	0	30	61	72
Problem formulation	2	2	31	57	60
Lifelong learning	2	6	17	70	68
Knowledge sharing	1	0	22	77	52
Planning	1	1	32	68	50
Adaptability to changing tasks	0	3	24	68	56
Creativity	0	5	37	69	50
Innovative thinking	1	4	29	67	50
Theoretical analysis	1	8	33	74	45
Ethics	1	10	36	61	55
Adaptability to changing work forms	0	3	40	64	45
Strategic thinking	0	6	41	61	43
Social responsibility	3	14	42	62	41
Knowledge of social issues	0	3	34	71	52
Networking	1	8	53	53	37
Ability to perform experiments	15	39	58	34	16
Knowledge of sustainability	14	28	56	45	20
Knowledge of global contexts	0	4	52	73	33
Business knowledge	3	8	55	56	40
Management	2	16	57	59	18
Design	20	34	58	37	13

**Table 13: Answer to question: Please indicate how important you think the following competencies are for the student's future work?** Social Science (N: 151- 163).

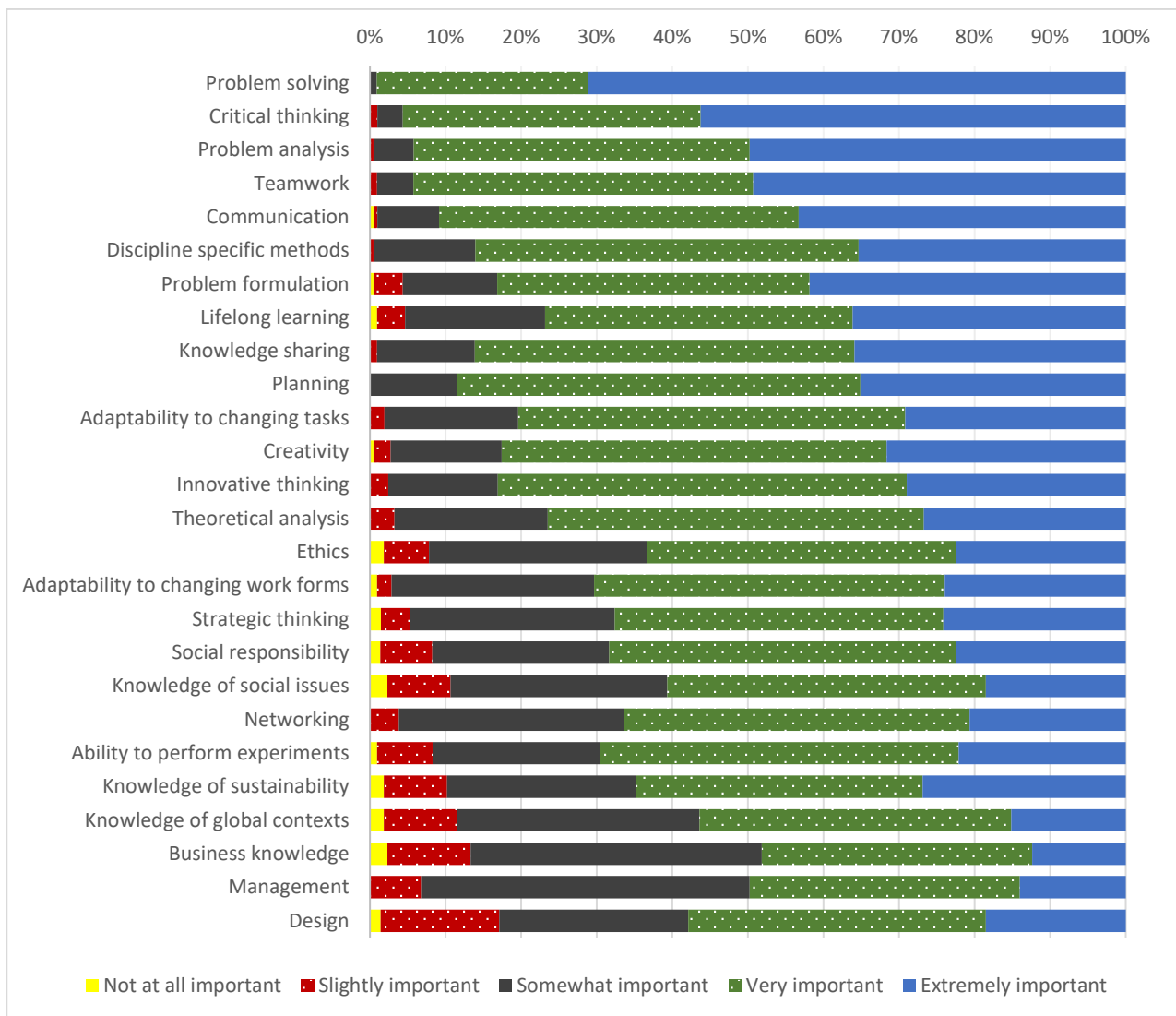


**Figure 7: Answer to question: Please indicate how important you think the following competencies are for the student's future work? Social Science (N: 151- 163).**

## TECH

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Problem solving	0	0	2	61	155
Critical thinking	0	2	7	82	117
Problem analysis	0	1	11	92	103
Teamwork	0	2	10	94	103
Communication	1	1	17	99	90
Discipline specific methods	0	1	29	109	76
Problem formulation	1	8	26	86	87
Lifelong learning	2	8	40	88	78
Knowledge sharing	0	2	27	105	75
Planning	0	0	24	111	73
Adaptability to changing tasks	0	4	37	107	61
Creativity	1	5	32	111	69
Innovative thinking	0	5	30	112	60
Theoretical analysis	0	7	44	108	58
Ethics	4	13	63	89	49
Adaptability to changing work forms	2	4	56	97	50
Strategic thinking	3	8	56	90	50
Social responsibility	3	15	51	100	49
Knowledge of social issues	5	18	62	91	40
Networking	0	8	62	95	43
Ability to perform experiments	2	16	48	103	48
Knowledge of sustainability	4	18	54	82	58
Knowledge of global contexts	4	21	70	90	33
Business knowledge	5	24	84	78	27
Management	0	14	90	74	29
Design	3	34	54	85	40

**Table 14: Answer to question: Please indicate how important you think the following competencies are for the student's future work? TECH (N: 207 – 218).**



**Figure 8: Answer to question: Please indicate how important you think the following competencies are for the student's future work? TECH (N: 207 – 218).**

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## 4. GROUP-BASED PROJECT WORK

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One of the themes in the questionnaire was the employees' opinions on students' learning in group-based project work. Ten statements were presented to the respondent and they were asked to indicate to what extent they agreed or disagreed with each statement on a 5-point scale ranging from "completely disagree" through "tend to disagree", "neither agree nor disagree", "tend to agree" to "completely agree".

Both positive and negative statements to PBL are based on literature review. For all the PBL competences, there is clearly documentation that students from PBL studies do gain these types of competences and that students from PBL studies seem to achieve these competences to a higher degree compared with students from other curriculum models. The group-based project assessment has also been well researched as the best aligned model for assessing collaborative project work.

There are two statements on types of problems and knowledge in the PBL process. Research has indicated that student motivation is created by the degree of influencing the learning process and therefore broad frameworks/themes for the student projects are recommendable. Some of the critics of PBL is that students achieve too specialised knowledge and that students lack overview of the disciplines (Strobel and van Barneveld, 2009; Kolmos and Graaff, 2014).

The statements on student rooms derive from internal discussion at AAU. It has been a tough discussion at several faculties to figure out what the "break-even point" would be for students to have proper space to facilitate the learning process. There will be no answer to this – but it will be important to identify possible differences among the academic staff at the various faculties.

The results indicate that more than half of the respondents tend to agree or completely agree that project work has a positive impact on a range of the PBL competences, lifelong learning and preparedness for work.

More than half of the respondents also agree that the group-based project examination is suitable for evaluation of students learning in projects and that the space for group rooms is important.

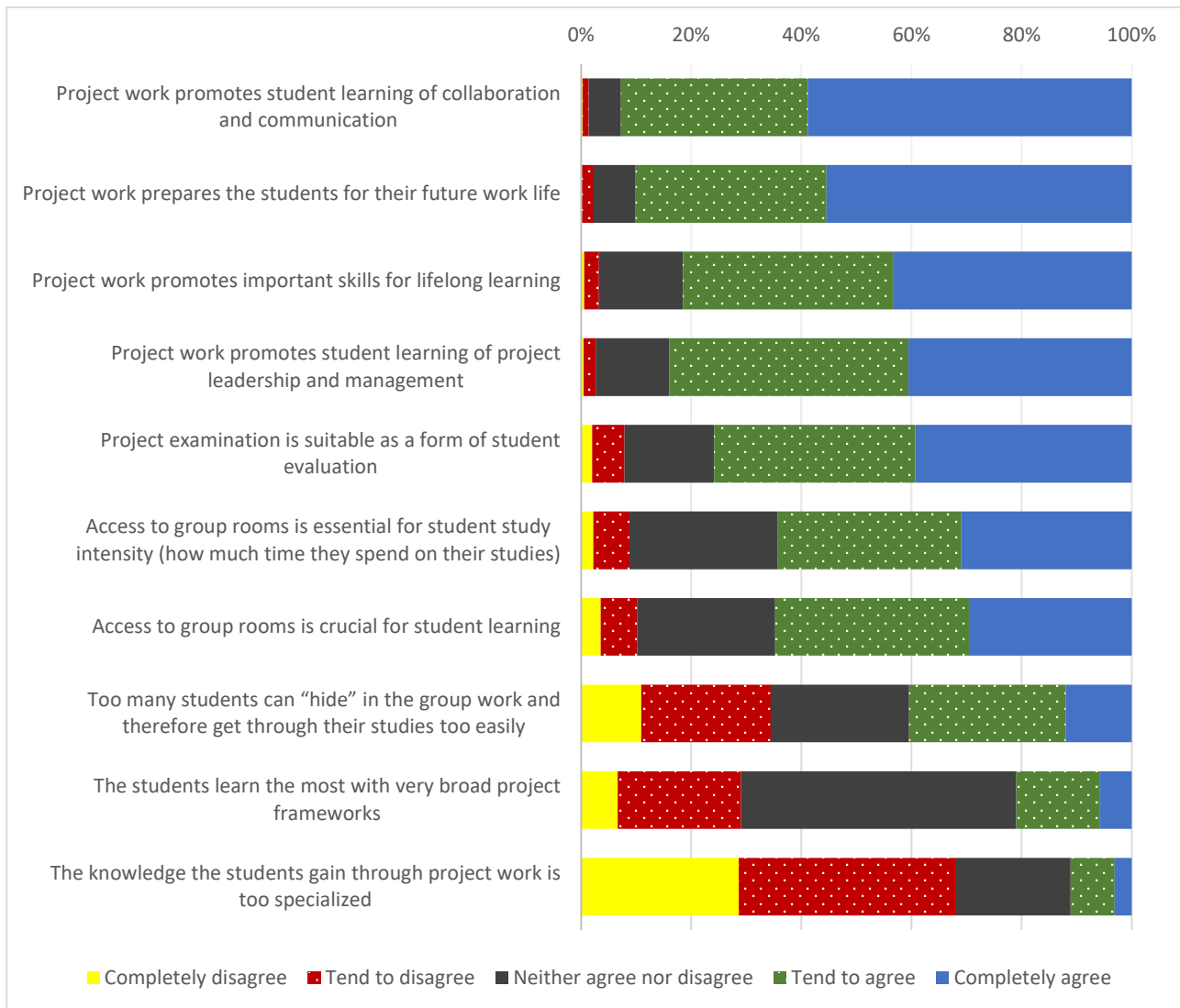
Around 1/3 of the respondents indicate that they agree that students can hide – and around 1/3 disagree. This is a rather high number of academic staff that actually agree on the this. However, the respondents disagree that the knowledge gained from projects is too specialised.

The respondents were asked: Here are a few questions about the students' learning in the group-based project work. Please indicate to what extent you agree or disagree with each statement?

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
Project work promotes student learning of collaboration and communication	2	10	53	306	530
Project work prepares the students for their future work life	1	18	70	313	500
Project work promotes important skills for lifelong learning	5	24	136	341	388
Project work promotes student learning of project leadership and management	4	20	120	392	366
Project examination is suitable as a form of student evaluation	18	53	147	330	355
Access to group rooms is essential for student study intensity (how much time they spend on their studies)	20	59	243	301	279
Access to group rooms is crucial for student learning	32	59	225	316	265
Too many students can “hide” in the group work and therefore get through their studies too easily	98	212	226	256	108
The students learn the most with very broad project frameworks	60	202	451	136	53
The knowledge the students gain through project work is too specialized	258	354	189	72	28

**Table 15: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* All respondents (N: 894 – 903).



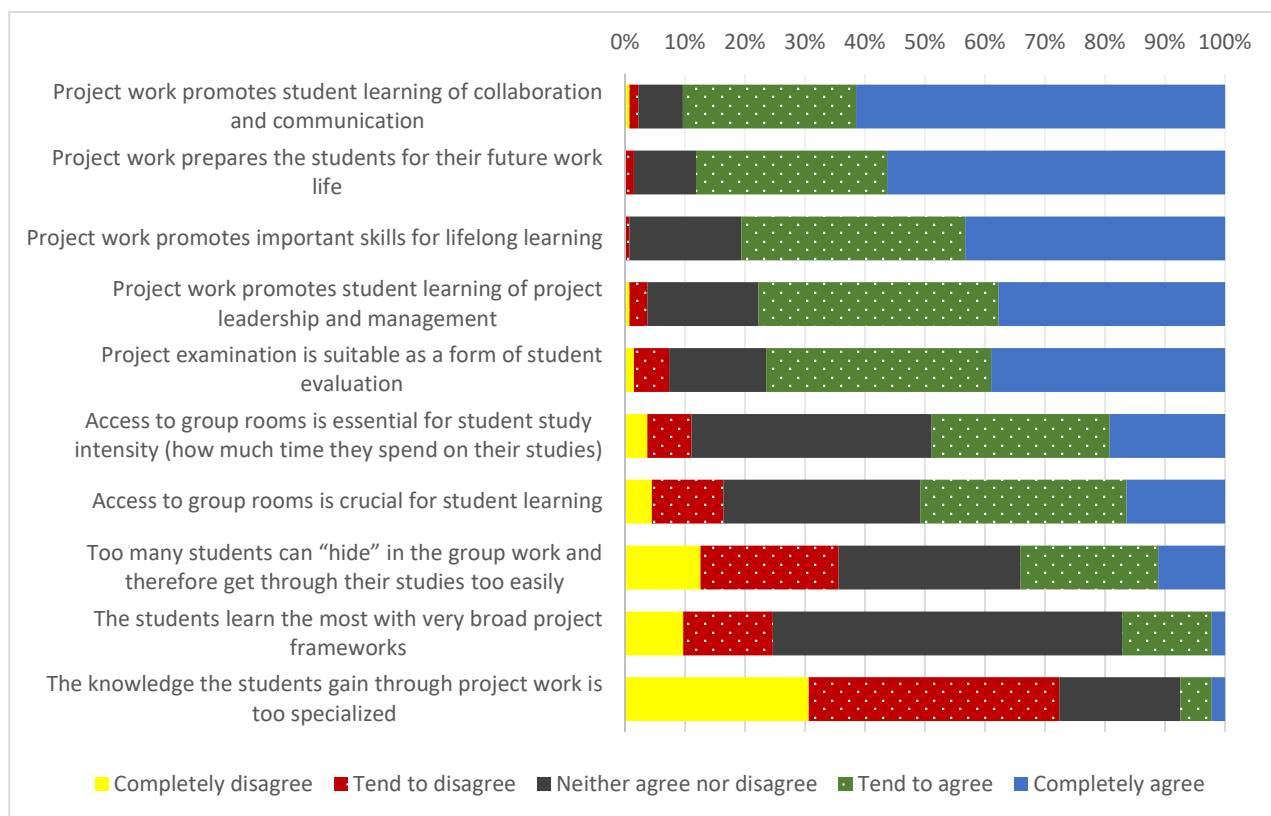


**Figure 9: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* All respondents (N: 894 – 903).

## Cross Faculty departments

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
Project work promotes student learning of collaboration and communication	1	2	10	39	83
Project work prepares the students for their future work life	0	2	14	43	76
Project work promotes important skills for lifelong learning	0	1	25	50	58
Project work promotes student learning of project leadership and management	1	4	25	54	51
Project examination is suitable as a form of student evaluation	2	8	22	51	53
Access to group rooms is essential for student study intensity (how much time they spend on their studies)	5	10	54	40	26
Access to group rooms is crucial for student learning	6	16	44	46	22
Too many students can “hide” in the group work and therefore get through their studies too easily	17	31	41	31	15
The students learn the most with very broad project frameworks	13	20	78	20	3
The knowledge the students gain through project work is too specialized	41	56	27	7	3

**Table 16: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* Cross faculty departments (N: 134 – 136).

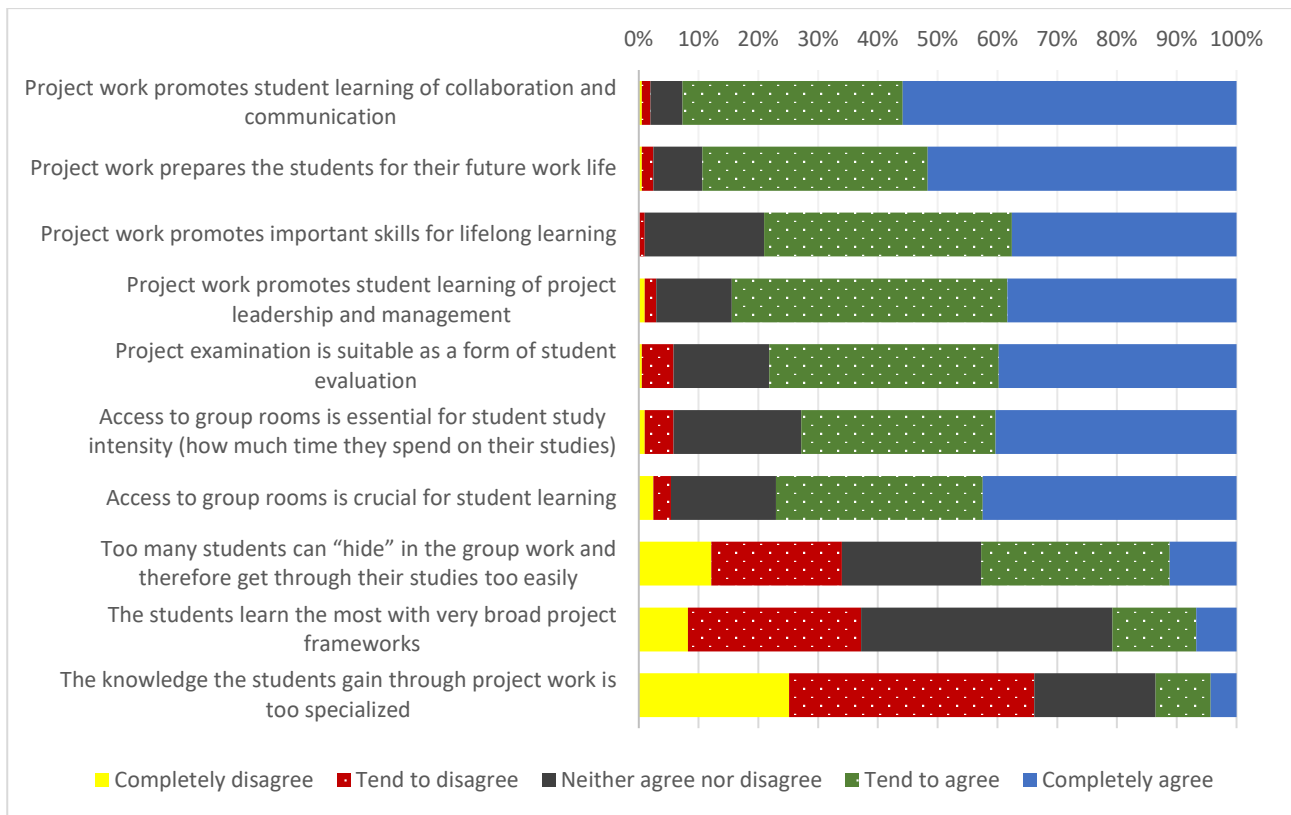


**Figure 10: Answer to question on group-based project work: Please indicate to what extent you agree or disagree with each statement? Cross faculty departments (N: 134 – 136).**

## Engineering

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
Project work promotes student learning of collaboration and communication	1	3	11	76	115
Project work prepares the students for their future work life	1	4	17	78	107
Project work promotes important skills for lifelong learning	0	2	41	85	77
Project work promotes student learning of project leadership and management	2	4	26	95	79
Project examination is suitable as a form of student evaluation	1	11	33	79	82
Access to group rooms is essential for student study intensity (how much time they spend on their studies)	2	10	44	67	83
Access to group rooms is crucial for student learning	5	6	36	71	87
Too many students can “hide” in the group work and therefore get through their studies too easily	25	45	48	65	23
The students learn the most with very broad project frameworks	17	60	87	29	14
The knowledge the students gain through project work is too specialized	52	85	42	19	9

**Table 17: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* Engineering (N: 205 - 207).

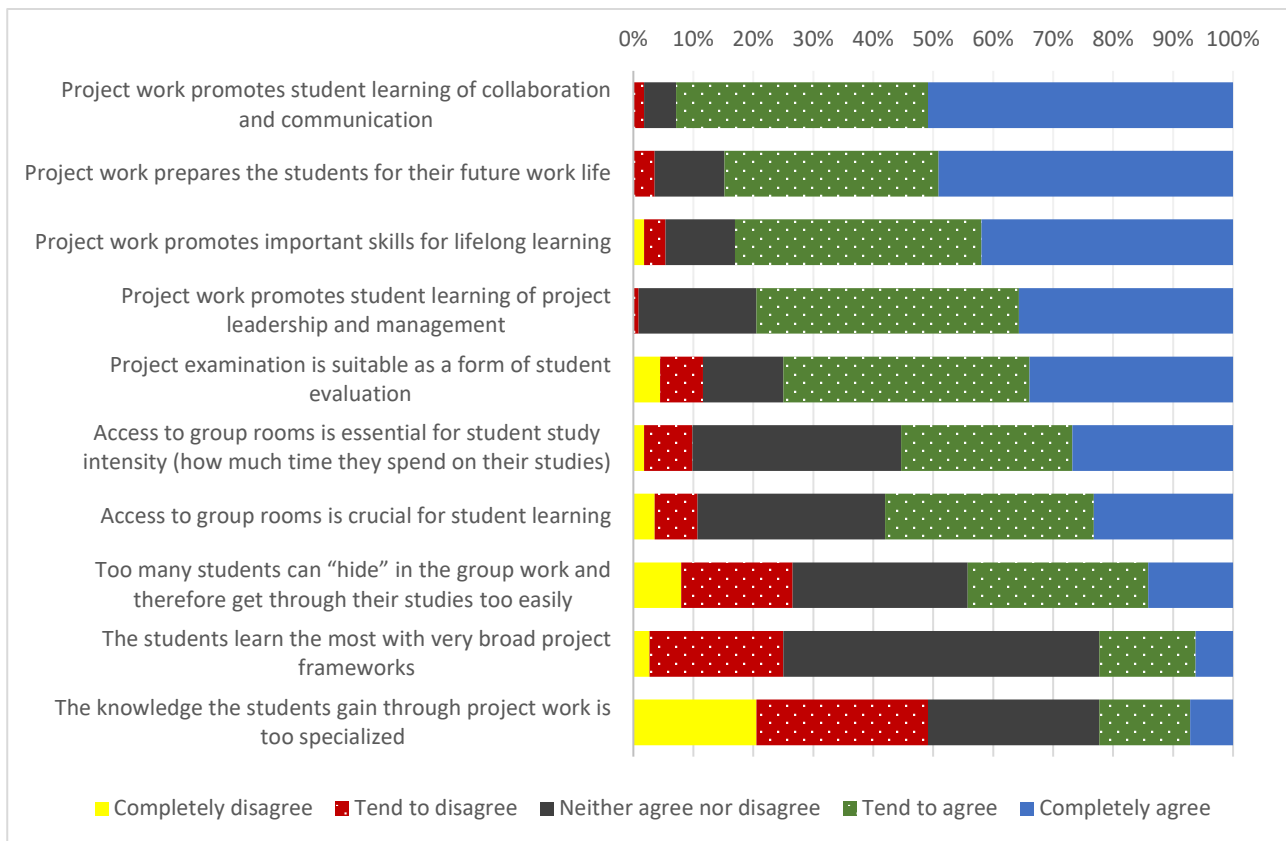


**Figure 11: Answer to question on group-based project work: Please indicate to what extent you agree or disagree with each statement? Engineering (N: 205 - 207).**

## Health

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
Project work promotes student learning of collaboration and communication	0	2	6	47	57
Project work prepares the students for their future work life	0	4	13	40	55
Project work promotes important skills for lifelong learning	2	4	13	46	47
Project work promotes student learning of project leadership and management	0	1	22	49	40
Project examination is suitable as a form of student evaluation	5	8	15	46	38
Access to group rooms is essential for student study intensity (how much time they spend on their studies)	2	9	39	32	30
Access to group rooms is crucial for student learning	4	8	35	39	26
Too many students can “hide” in the group work and therefore get through their studies too easily	9	21	33	34	16
The students learn the most with very broad project frameworks	3	25	59	18	7
The knowledge the students gain through project work is too specialized	23	32	32	17	8

**Table 18: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* Health (N: 134 – 136).



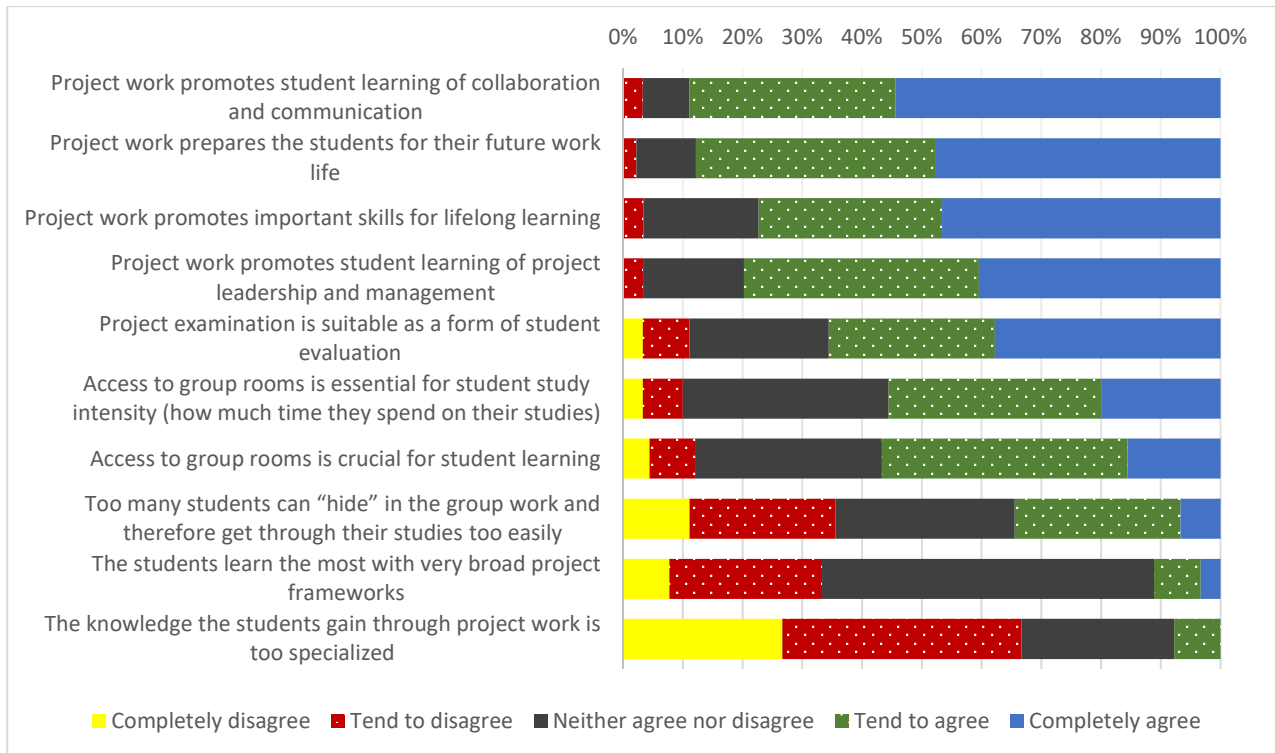
**Figure 12: Answer to question on group-based project work: Please indicate to what extent you agree or disagree with each statement? Health (N: 134 – 136).**

## HUM

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
Project work promotes student learning of collaboration and communication	0	3	7	31	49
Project work prepares the students for their future work life	0	2	9	36	43
Project work promotes important skills for lifelong learning	0	3	17	27	41
Project work promotes student learning of project leadership and management	0	3	15	35	36
Project examination is suitable as a form of student evaluation	3	7	21	25	34
Access to group rooms is essential for student study intensity (how much time they spend on their studies)	3	6	31	32	18
Access to group rooms is crucial for student learning	4	7	28	37	14
Too many students can "hide" in the group work and therefore get through their studies too easily	10	22	27	25	6
The students learn the most with very broad project frameworks	7	23	50	7	3
The knowledge the students gain through project work is too specialized	24	36	23	7	0

**Table 19: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* HUM (N: 88 - 90).



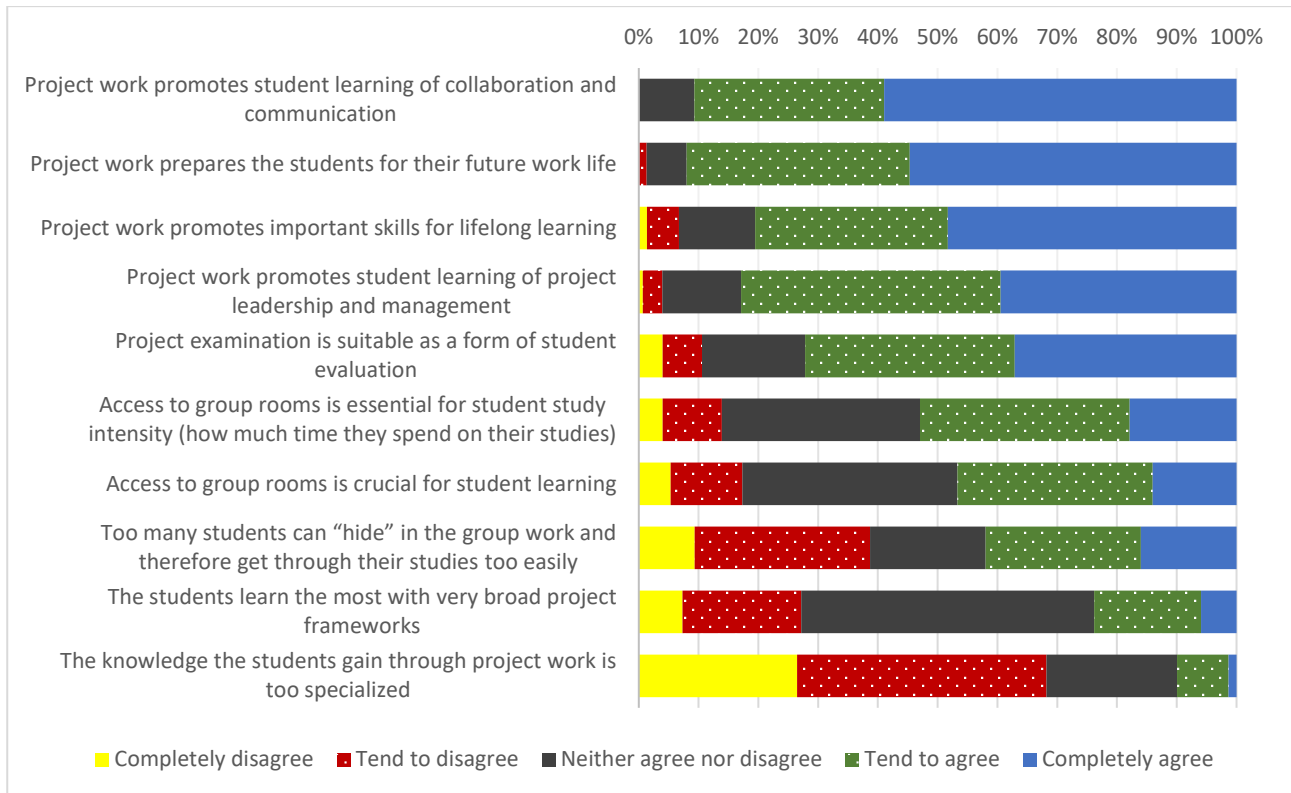


**Figure 13: Answer to question on group-based project work: Please indicate to what extent you agree or disagree with each statement? HUM (N: 88 - 90).**

## Social Sciences

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
Project work promotes student learning of collaboration and communication	0	0	14	48	89
Project work prepares the students for their future work life	0	2	10	56	82
Project work promotes important skills for lifelong learning	2	8	19	48	72
Project work promotes student learning of project leadership and management	1	5	20	66	60
Project examination is suitable as a form of student evaluation	6	10	26	53	56
Access to group rooms is essential for student study intensity (how much time they spend on their studies)	6	15	50	53	27
Access to group rooms is crucial for student learning	8	18	54	49	21
Too many students can “hide” in the group work and therefore get through their studies too easily	14	44	29	39	24
The students learn the most with very broad project frameworks	11	30	74	27	9
The knowledge the students gain through project work is too specialized	40	63	33	13	2

**Table 20: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* Social Sciences (N: 149 - 152).

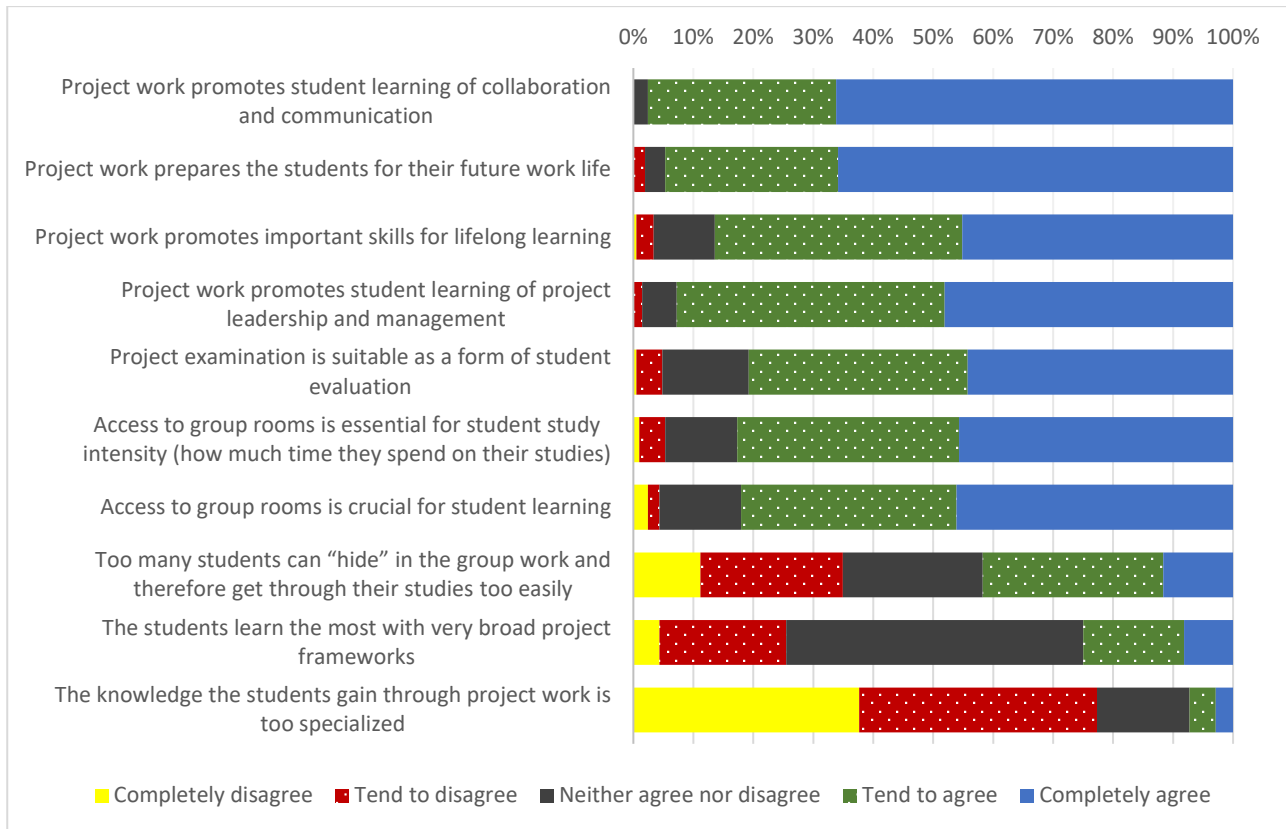


**Figure 14: Answer to question on group-based project work: Please indicate to what extent you agree or disagree with each statement?** Social Sciences (N: 149 - 152).

## TECH

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
Project work promotes student learning of collaboration and communication	0	0	5	65	137
Project work prepares the students for their future work life	0	4	7	60	137
Project work promotes important skills for lifelong learning	1	6	21	85	93
Project work promotes student learning of project leadership and management	0	3	12	93	100
Project examination is suitable as a form of student evaluation	1	9	30	76	92
Access to group rooms is essential for student study intensity (how much time they spend on their studies)	2	9	25	77	95
Access to group rooms is crucial for student learning	5	4	28	74	95
Too many students can “hide” in the group work and therefore get through their studies too easily	23	49	48	62	24
The students learn the most with very broad project frameworks	9	44	103	35	17
The knowledge the students gain through project work is too specialized	78	82	32	9	6

**Table 21: Answer to question on group-based project work:** *Please indicate to what extent you agree or disagree with each statement?* TECH (N: 206 - 208).



**Figure 15: Answer to question on group-based project work: Please indicate to what extent you agree or disagree with each statement? TECH (N: 206 - 208).**

## 5. ACTIVITIES

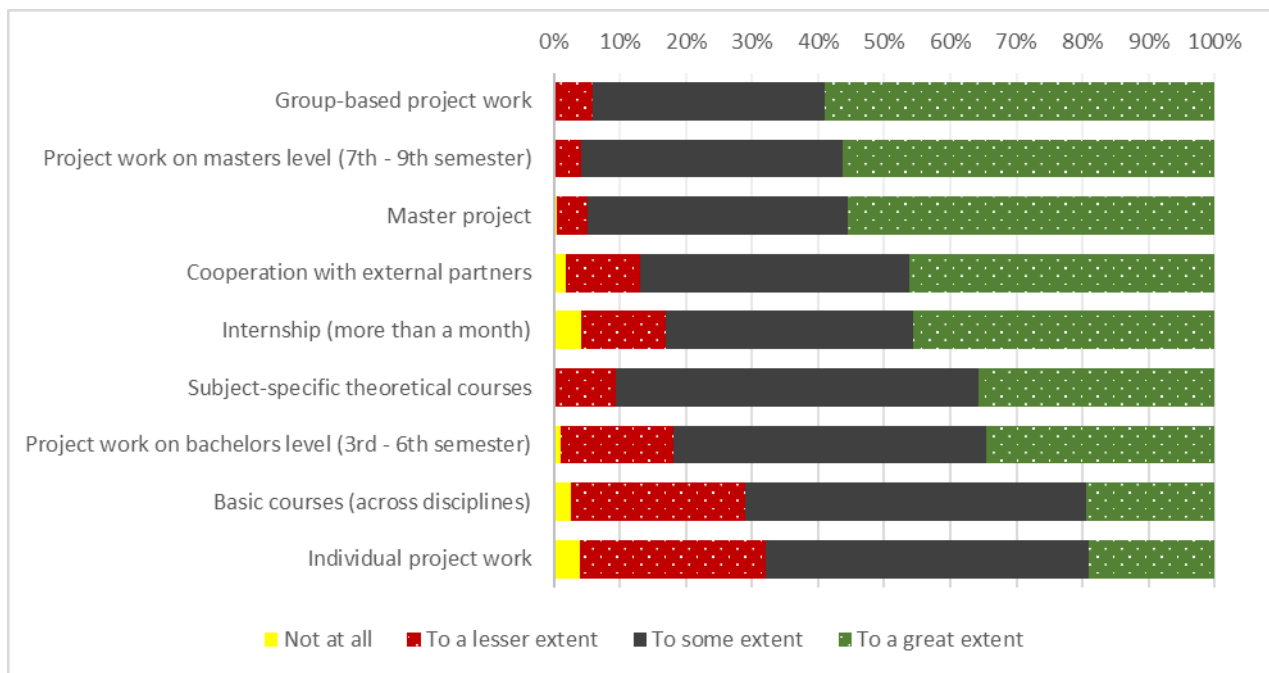
A central theme for the investigation was what particular study activities the teaching staff meant were essential to the students' learning. In creating the list of activities inspiration was found in the PROCEED and PROCEED-2-WORK surveys done by the UNESCO center for Problem-Based Learning from 2010 to 2016, adapted through input from the PBL-Future group to ensure that the most common activities was covered and the terminology was appropriate (Kolmos and Bylov, 2016). The 4-point scale used in the PROCEED and PROCEED-2-Work projects was also adopted. The respondents in PROCEED were students – and there is also a student population from the two engineering/science faculties at AAU and the rest of the engineering institutions in DK which can be relevant to compare to.

In general, nearly 60% find that students get prepared by the group based project work; however, we had expected that this percentage would be higher at AAU. It is also surprising that master projects do score more or less the same as the projects on 7-9<sup>th</sup> semester. We would have expected that the master project would be more oriented to later work. We expect the results to be more varied at the single faculties.

The respondents were asked: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?

	Not at all	To a lesser extent	To some extent	To a great extent
<b>Group-based project work</b>	3	49	314	525
<b>Project work on master level (7th - 9th semester)</b>	3	35	354	503
<b>Master project</b>	5	41	351	497
<b>Cooperation with external partners</b>	16	100	365	412
<b>Internship (more than a month)</b>	37	115	333	407
<b>Subject-specific theoretical courses</b>	3	81	493	320
<b>Project work on bachelors level (3rd - 6th semester)</b>	9	153	422	308
<b>Basic courses (across disciplines)</b>	23	235	461	174
<b>Individual project work</b>	35	251	436	170

**Table 22: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market? All respondents (N: 891 - 897).**

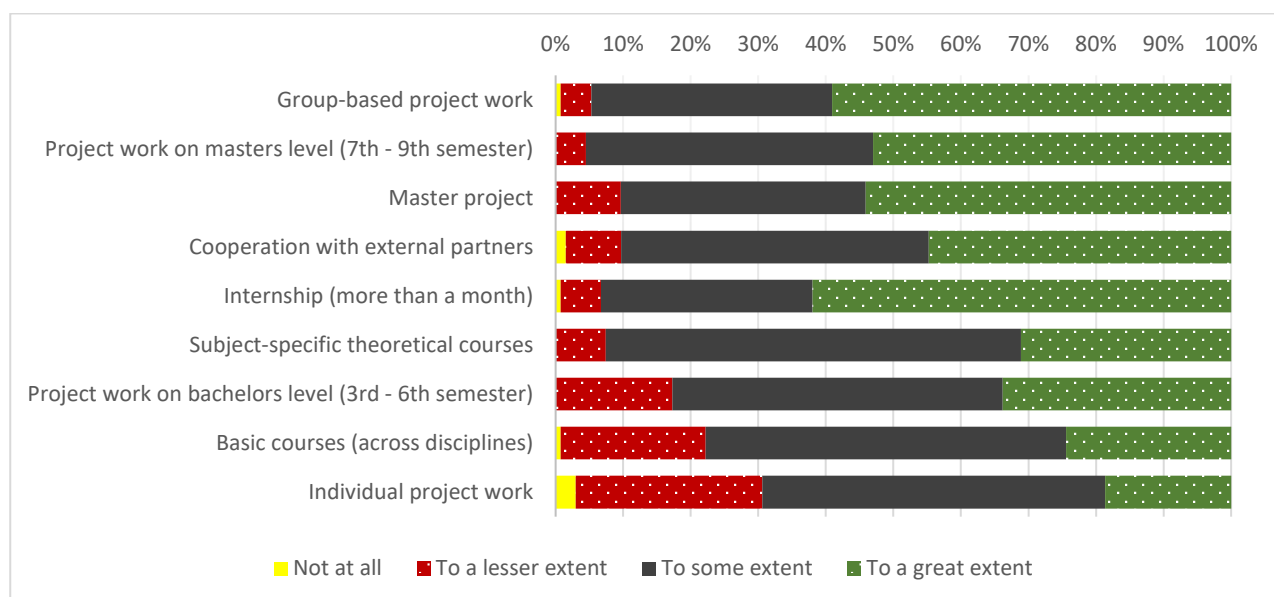


**Figure 16: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market? All respondents (N: 891 - 897).**

## Cross Faculty departments

	Not at all	To a lesser extent	To some extent	To a great extent
Group-based project work	1	6	47	78
Project work on masters level (7th - 9th semester)	0	6	57	71
Master project	0	13	49	73
Cooperation with external partners	2	11	61	60
Internship (more than a month)	1	8	42	83
Subject-specific theoretical courses	0	10	83	42
Project work on bachelors level (3rd - 6th semester)	0	23	65	45
Basic courses (across disciplines)	1	29	72	33
Individual project work	4	37	68	25

**Table 23: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?** Cross faculty departments (N: 132 - 135).



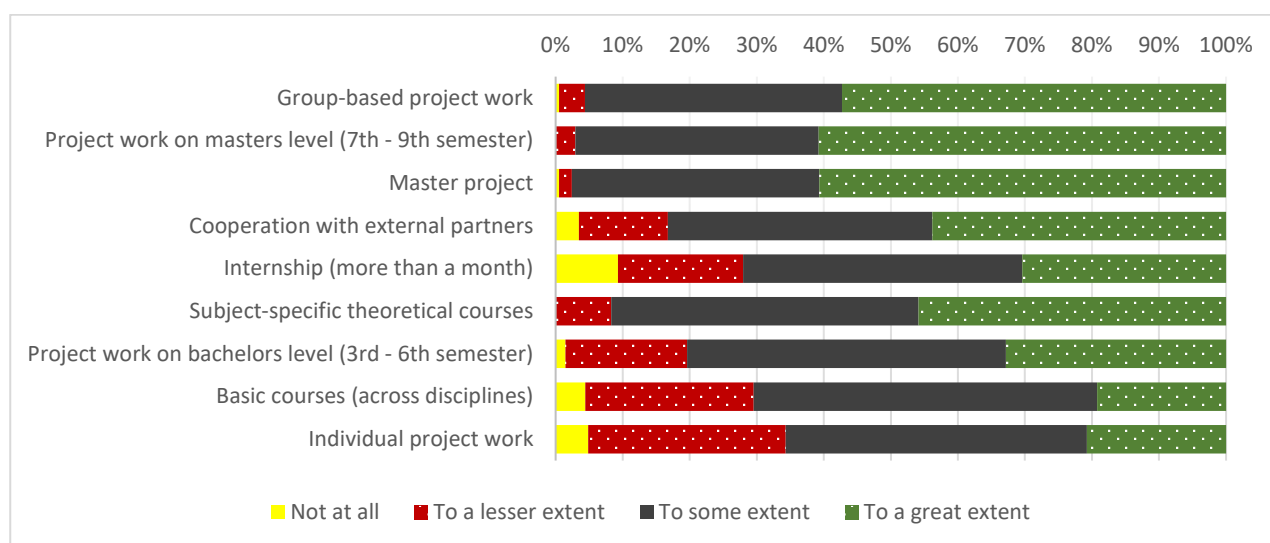
**Figure 17: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?** Cross faculty departments (N: 132 - 135).



## Engineering

	Not at all	To a lesser extent	To some extent	To a great extent
Group-based project work	1	8	79	118
Project work on masters level (7th - 9th semester)	0	6	74	124
Master project	1	4	76	125
Cooperation with external partners	7	27	80	89
Internship (more than a month)	19	38	85	62
Subject-specific theoretical courses	0	17	94	94
Project work on bachelors level (3rd - 6th semester)	3	37	97	67
Basic courses (across disciplines)	9	51	104	39
Individual project work	10	61	93	43

**Table 24: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?** Engineering (N: 203 - 207).

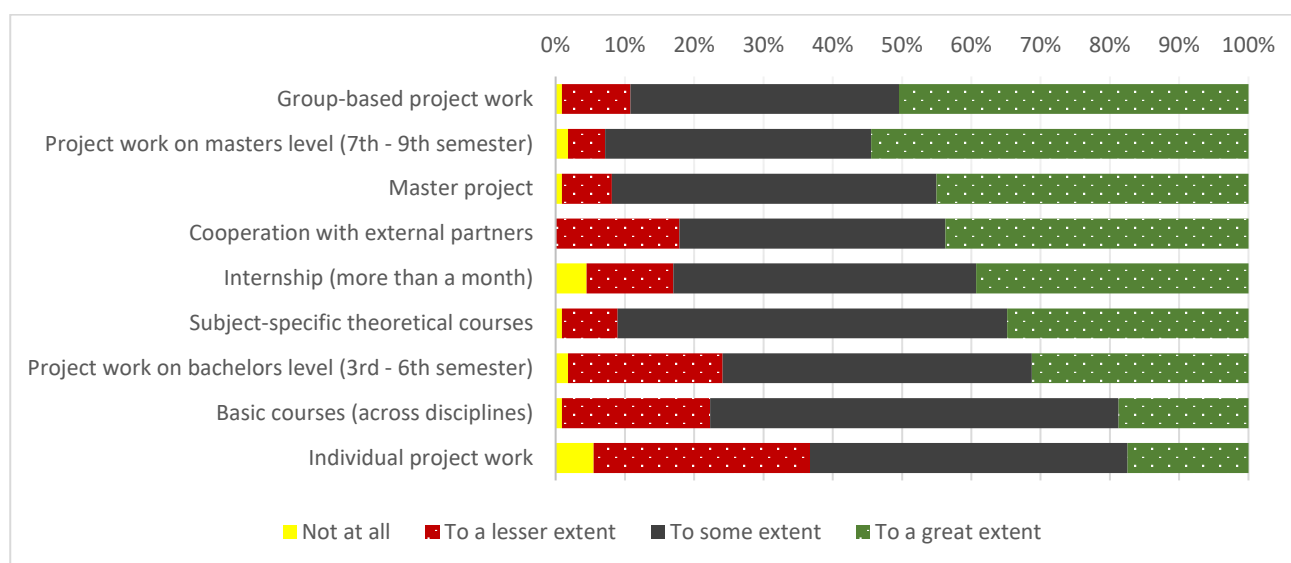


**Figure 18: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?** Engineering (N: 203 - 207).

## Health

	Not at all	To a lesser extent	To some extent	To a great extent
Group-based project work	1	11	43	56
Project work on masters level (7th - 9th semester)	2	6	43	61
Master project	1	8	52	50
Cooperation with external partners	0	20	43	49
Internship (more than a month)	5	14	49	44
Subject-specific theoretical courses	1	9	63	39
Project work on bachelors level (3rd - 6th semester)	2	25	50	35
Basic courses (across disciplines)	1	24	66	21
Individual project work	6	34	50	19

**Table 25: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?** Health (N: 109 - 112).

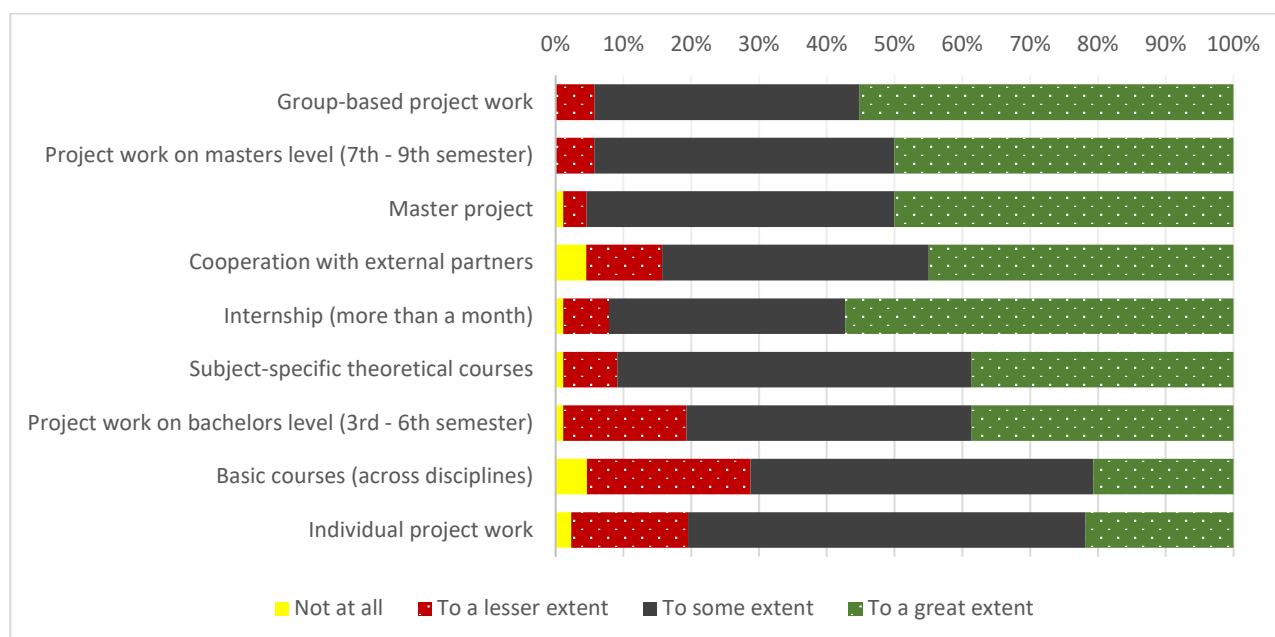


**Figure 19: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?** Health (N: 109 - 112).

## HUM

	Not at all	To a lesser extent	To some extent	To a great extent
Group-based project work	0	5	34	48
Project work on masters level (7th - 9th semester)	0	5	39	44
Master project	1	3	40	44
Cooperation with external partners	4	10	35	40
Internship (more than a month)	1	6	31	51
Subject-specific theoretical courses	1	7	46	34
Project work on bachelors level (3rd - 6th semester)	1	16	37	34
Basic courses (across disciplines)	4	21	44	18
Individual project work	2	15	51	19

**Table 26: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market? HUM (N: 87 - 89).**

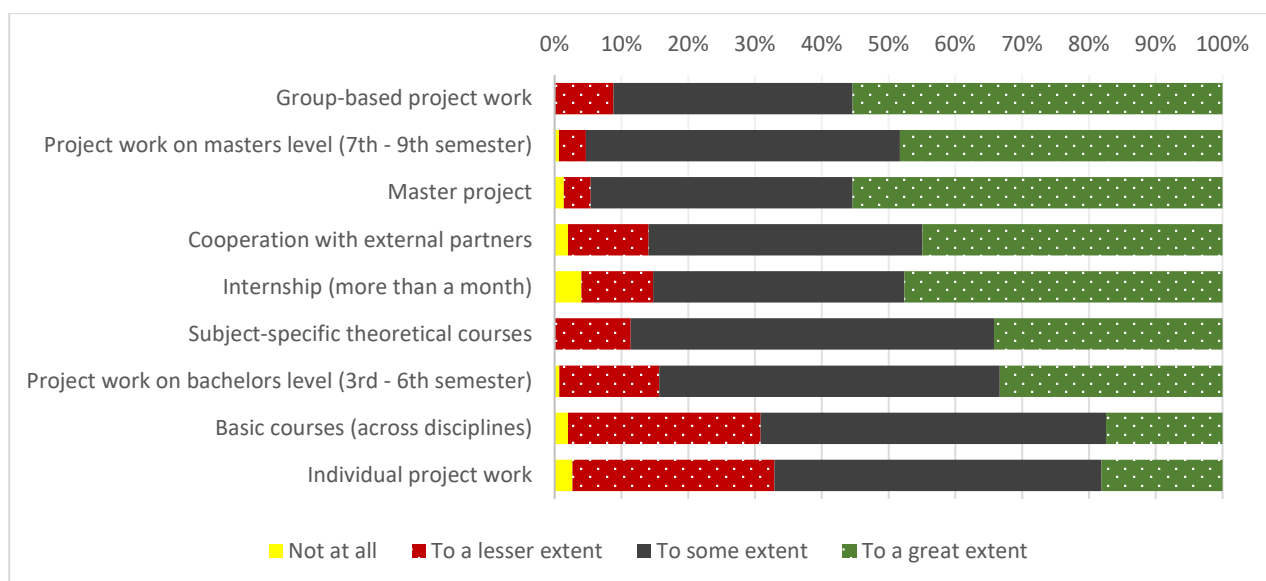


**Figure 20: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market? HUM (N: 87 - 89).**

## Social Sciences

	Not at all	To a lesser extent	To some extent	To a great extent
Group-based project work	0	13	53	82
Project work on masters level (7th - 9th semester)	1	6	70	72
Master project	2	6	58	82
Cooperation with external partners	3	18	61	67
Internship (more than a month)	6	16	56	71
Subject-specific theoretical courses	0	17	81	51
Project work on bachelors level (3rd - 6th semester)	1	22	75	49
Basic courses (across disciplines)	3	43	77	26
Individual project work	4	45	73	27

**Table 27:** Answer to the question: *To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?* Social Sciences (N: 147 - 149).

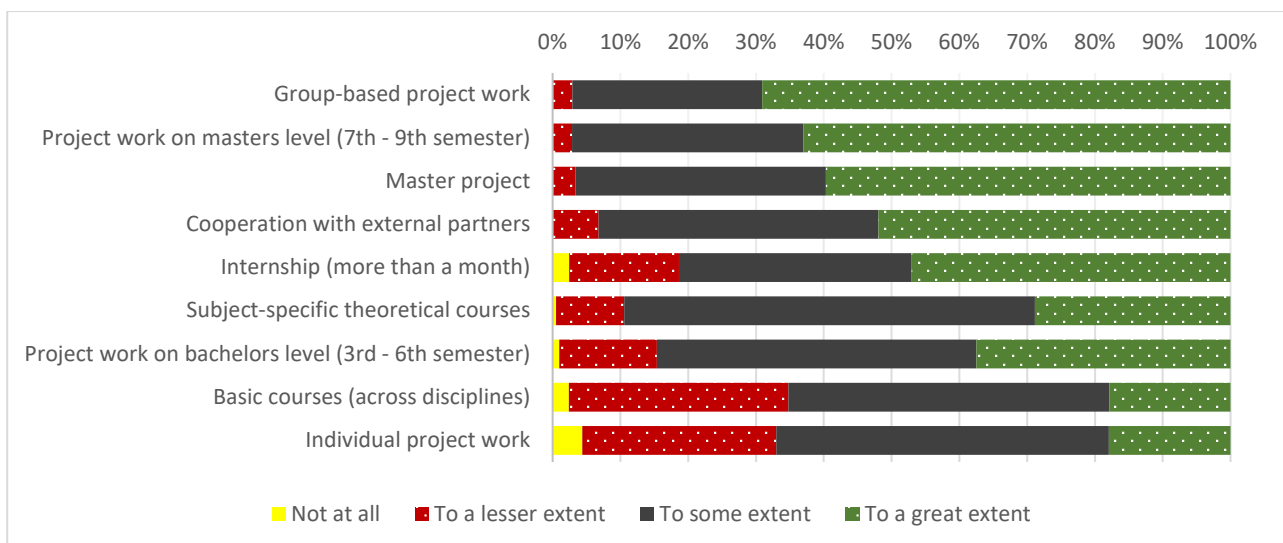


**Figure 21:** Answer to the question: *To which degree do the following activities in the curriculum contribute to students' preparedness for labour market?* Social Sciences (N: 147 - 149).

## TECH

	Not at all	To a lesser extent	To some extent	To a great extent
Group-based project work	0	6	58	143
Project work on masters level (7th - 9th semester)	0	6	71	131
Master project	0	7	76	123
Cooperation with external partners	0	14	85	107
Internship (more than a month)	5	33	70	96
Subject-specific theoretical courses	1	21	126	60
Project work on bachelors level (3rd - 6th semester)	2	30	98	78
Basic courses (across disciplines)	5	67	98	37
Individual project work	9	59	101	37

**Table 28: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market? TECH (N: 204 - 208).**



**Figure 22: Answer to the question: To which degree do the following activities in the curriculum contribute to students' preparedness for labour market? TECH (N: 204 - 208).**

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## 6. SELF-DETERMINATION

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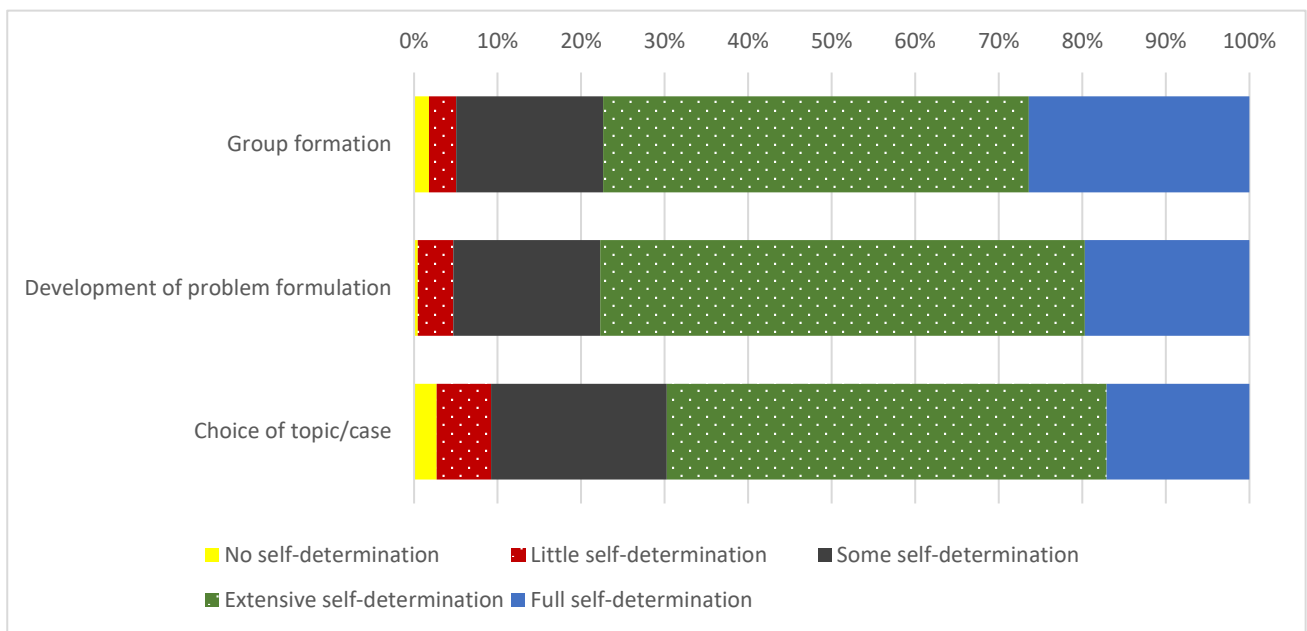
Participant directed learning has been one of the core learning principles for the Danish versions of PBL, in broader terms student centered learning. One of the subprojects in PBL-future is working specifically on the impact of the students' self-determination in different aspects of their project work, which inspired us to try and get a quantitative measure of the level of self-determination at AAU. This set of questions is included both in the student and staff questionnaire to get both perspectives. We have been interested in three milestones in the project process: the early group formation, the choice of the overall topic/case and the process of problem formulation, where the students formulate the specific problem.

Looking at the overall numbers, almost 70% of all the respondents answered that they believe that the students have extensive or full self-determination when it comes to group formation, development of problem formulation and their choice of topic/case attesting to the perceived openness and freedom of the project work at AAU.

The respondents were asked: The following statements relate to the degree of self-determination for the students. If it is not the same for all the places you teach, please provide the answer for where you most often teach. Please indicate the degree of student influence on the following items?

	No self-determination	Little self-determination	Some self-determination	Extensive self-determination	Full self-determination
<b>Group formation</b>	16	29	157	455	236
<b>Development of problem formulation</b>	4	38	157	518	176
<b>Choice of topic/case</b>	24	58	187	468	152

**Table 29: Answer to question on self-determination:** *Please indicate the degree of student influence on the following items?* All respondents (N: 889 - 893).

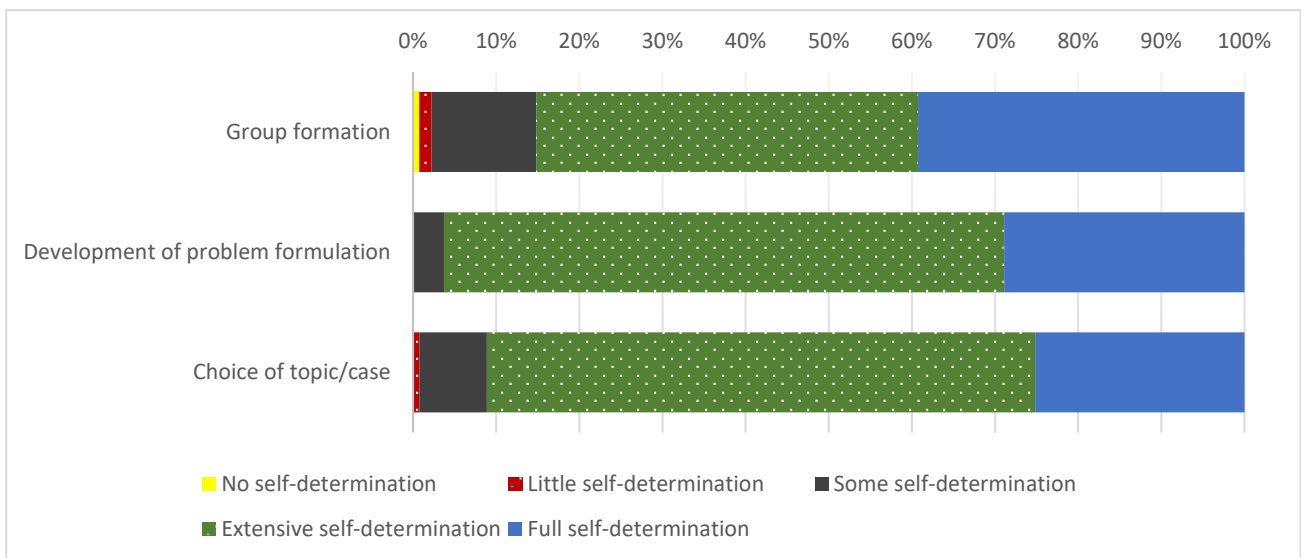


**Figure 23: Answer to question on self-determination:** *Please indicate the degree of student influence on the following items?* All respondents (N: 889 - 893).

## Cross Faculty departments

	No self-determination	Little self-determination	Some self-determination	Extensive self-determination	Full self-determination
Group formation	1	2	17	62	53
Development of problem formulation	0	0	5	91	39
Choice of topic/case	0	1	11	89	34

**Table 30: Answer to question on self-determination: Please indicate the degree of student influence on the following items?** Cross faculty departments (N: 135).



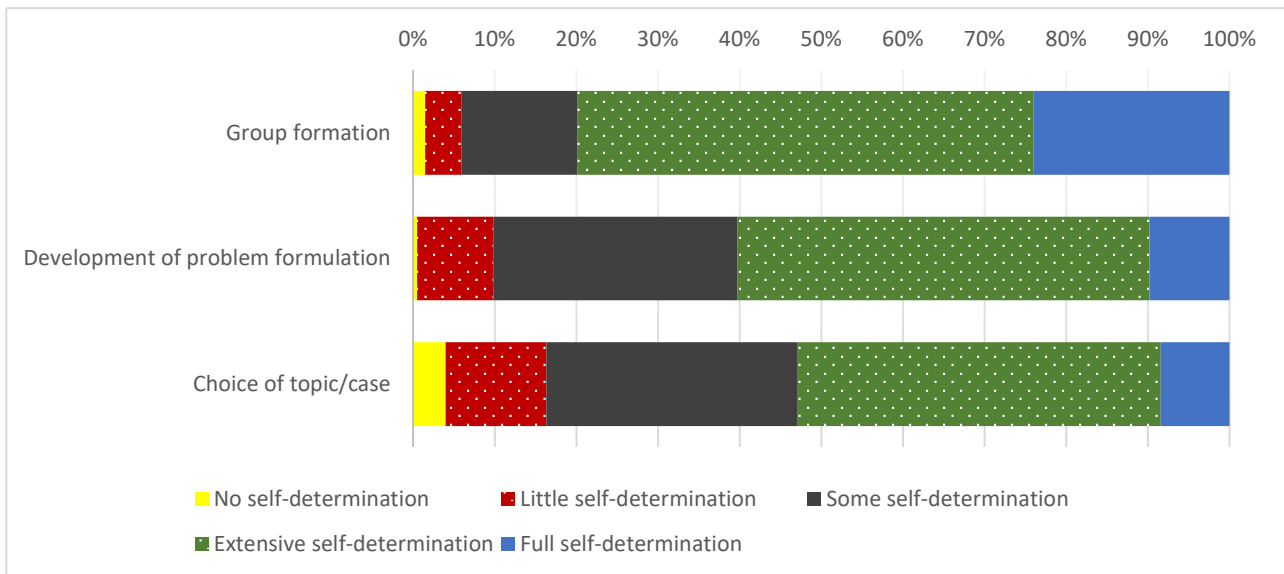
**Figure 24: Answer to question on self-determination: Please indicate the degree of student influence on the following items?** Cross faculty departments (N: 135).



## Engineering

	No self-determination	Little self-determination	Some self-determination	Extensive self-determination	Full self-determination
Group formation	3	9	29	114	49
Development of problem formulation	1	19	61	103	20
Choice of topic/case	8	25	62	90	17

**Table 31: Answer to question on self-determination:** *Please indicate the degree of student influence on the following items?* Engineering (N: 202 - 204).

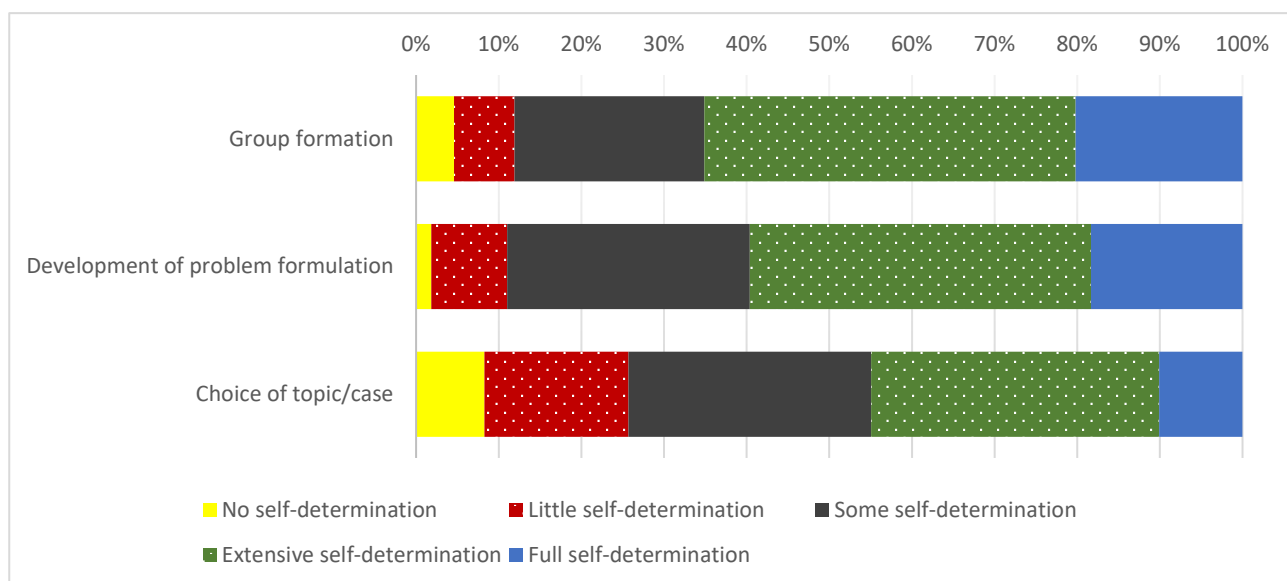


**Figure 25: Answer to question on self-determination:** *Please indicate the degree of student influence on the following items?* Engineering (N: 202 - 204).

## Health

	No self-determination	Little self-determination	Some self-determination	Extensive self-determination	Full self-determination
Group formation	5	8	25	49	22
Development of problem formulation	2	10	32	45	20
Choice of topic/case	9	19	32	38	11

**Table 32: Answer to question on self-determination: Please indicate the degree of student influence on the following items? Health (N: 109).**

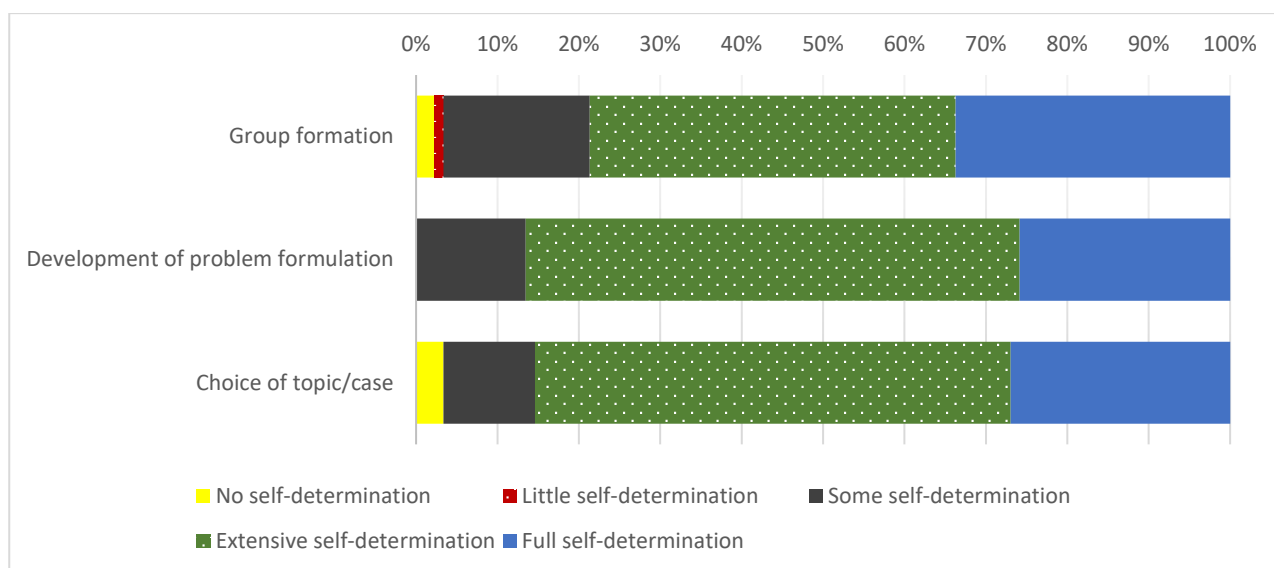


**Figure 26: Answer to question on self-determination: Please indicate the degree of student influence on the following items? Health (N: 109).**

## HUM

	No self-determination	Little self-determination	Some self-determination	Extensive self-determination	Full self-determination
Group formation	2	1	16	40	30
Development of problem formulation	0	0	12	54	23
Choice of topic/case	3	0	10	52	24

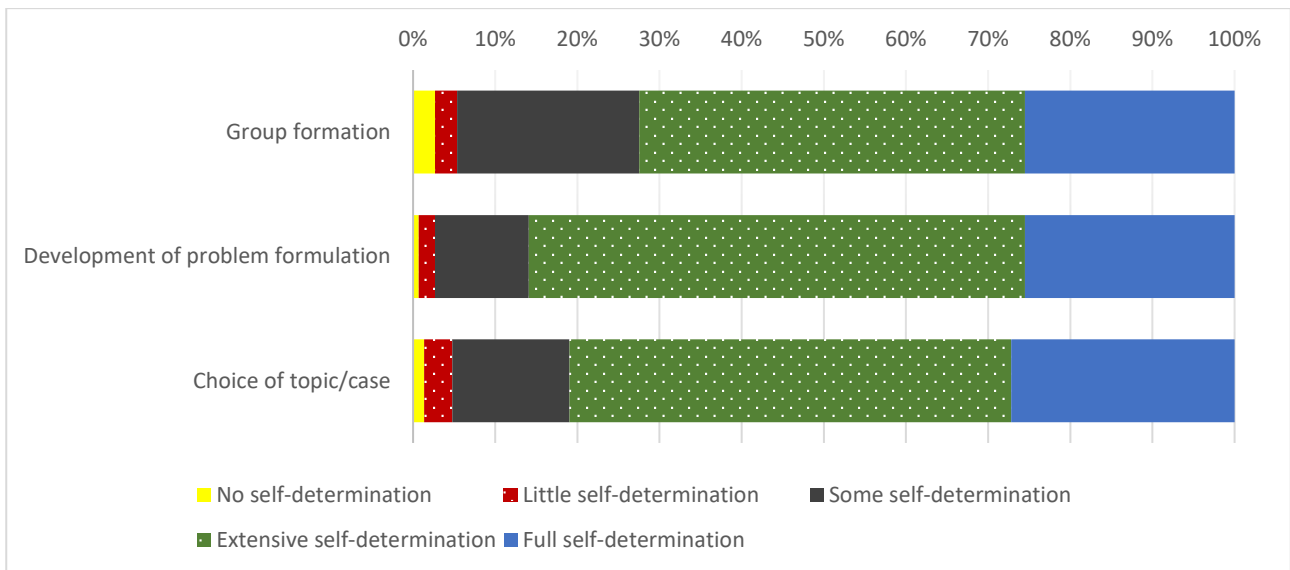
**Table 33: Answer to question on self-determination: Please indicate the degree of student influence on the following items? HUM (N: 89).**



**Figure 27: Answer to question on self-determination: Please indicate the degree of student influence on the following items? HUM (N: 89).**

	No self-determination	Little self-determination	Some self-determination	Extensive self-determination	Full self-determination
Group formation	4	4	33	70	38
Development of problem formulation	1	3	17	90	38
Choice of topic/case	2	5	21	79	40

**Table 34: Answer to question on self-determination: Please indicate the degree of student influence on the following items? Social Sciences (N: 147 - 149).**

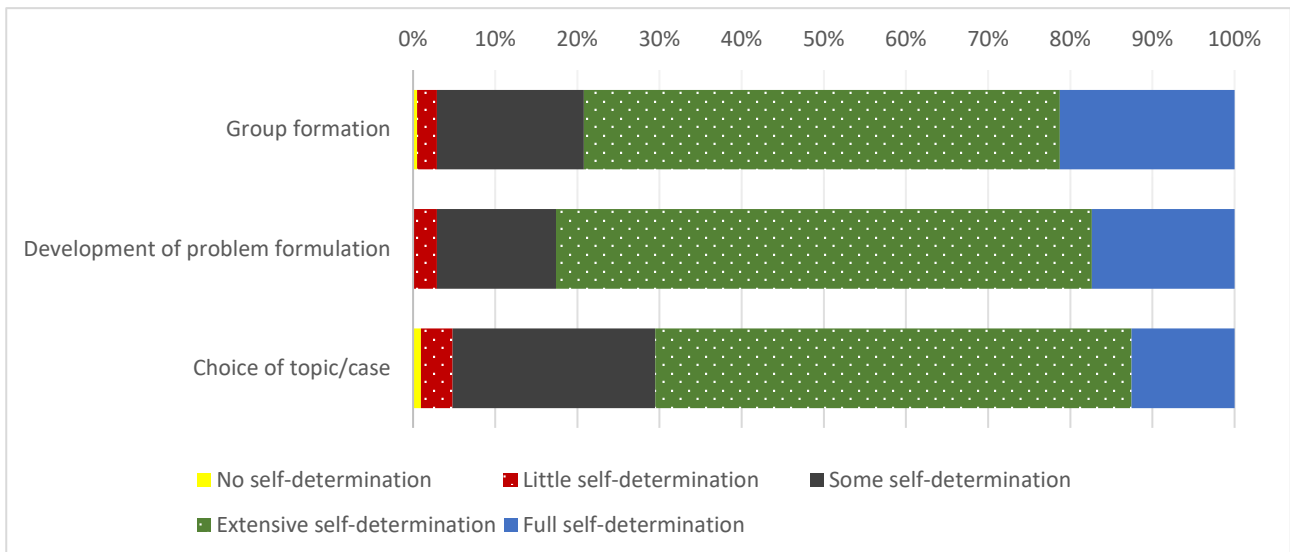


**Figure 28: Answer to question on self-determination: Please indicate the degree of student influence on the following items? Social Sciences (N: 147 - 149).**

## TECH

	No self-determination	Little self-determination	Some self-determination	Extensive self-determination	Full self-determination
Group formation	1	5	37	120	44
Development of problem formulation	0	6	30	135	36
Choice of topic/case	2	8	51	120	26

**Table 35: Answer to question on self-determination: Please indicate the degree of student influence on the following items? TECH (N: 207).**



**Figure 29: Answer to question on self-determination: Please indicate the degree of student influence on the following items? TECH (N: 207).**

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## 7. PROJECT SUPERVISION

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One of the key aspects of PBL is the role of the teacher as a supportive supervisor of student groups and facilitator of students' projects. During lectures and workshops the teacher often support the students by offering professional insights and ensure that they can attain a broad base of knowledge. In the project work the PBL teacher however takes on a different role as a group supervisor who's main task it is to facilitate that the students, on their own terms, can work in depth. The project supervisor in PBL does not act as a checklist and is only peripherally a partner in the student projects, supporting the students, offering inspiration, advice on methods and the process of project work, but gives no final answers.

The variables for project supervision are based on two perspectives:

- Theory on types of project supervision like the process and product supervisor (Kolmos & Holgaard, 2007)
- Educational framework and possibilities for supervision practice.

We tried to encompass the teaching staff's opinions on different aspects of project supervision with the questions below. They were asked to *"indicate to what extent you agree or disagree with each statement"*.

Around 80% of the respondents answer that they completely agree or tend to agree that the students' learning process is important as well as students have the possibility to work with real-world problems. Around 70% even completely agree or tend to agree that the process is more important than the product. More than 60% disagree or tend to disagree that it is difficult to formulate project proposals with real life problems. This is a rather high percentage of staff who is oriented towards to learning process and to identify problems from outside university.

We have asked if it is more difficult to supervise with broader and more open projects and if real world problems will have a consequence for the theoretical level in the projects. More than 1/3 completely or tend to disagree to these statements and around 20% of the respondents tend to agree or completely agree. This result is also surprising as it always will be much more work in helping students to narrow down a problem and to secure the relation between real problems and the theoretical analyses and solutions.

Around 70% of the respondents find that it is important for them to work on a PBL institution and it witness a committed group of academic staff at AAU. A bit more than half of the respondents finds there not enough time for qualified supervision – but ¼ of the respondents find that there is enough time. This result is surprising given the fact that the resources have been cut.

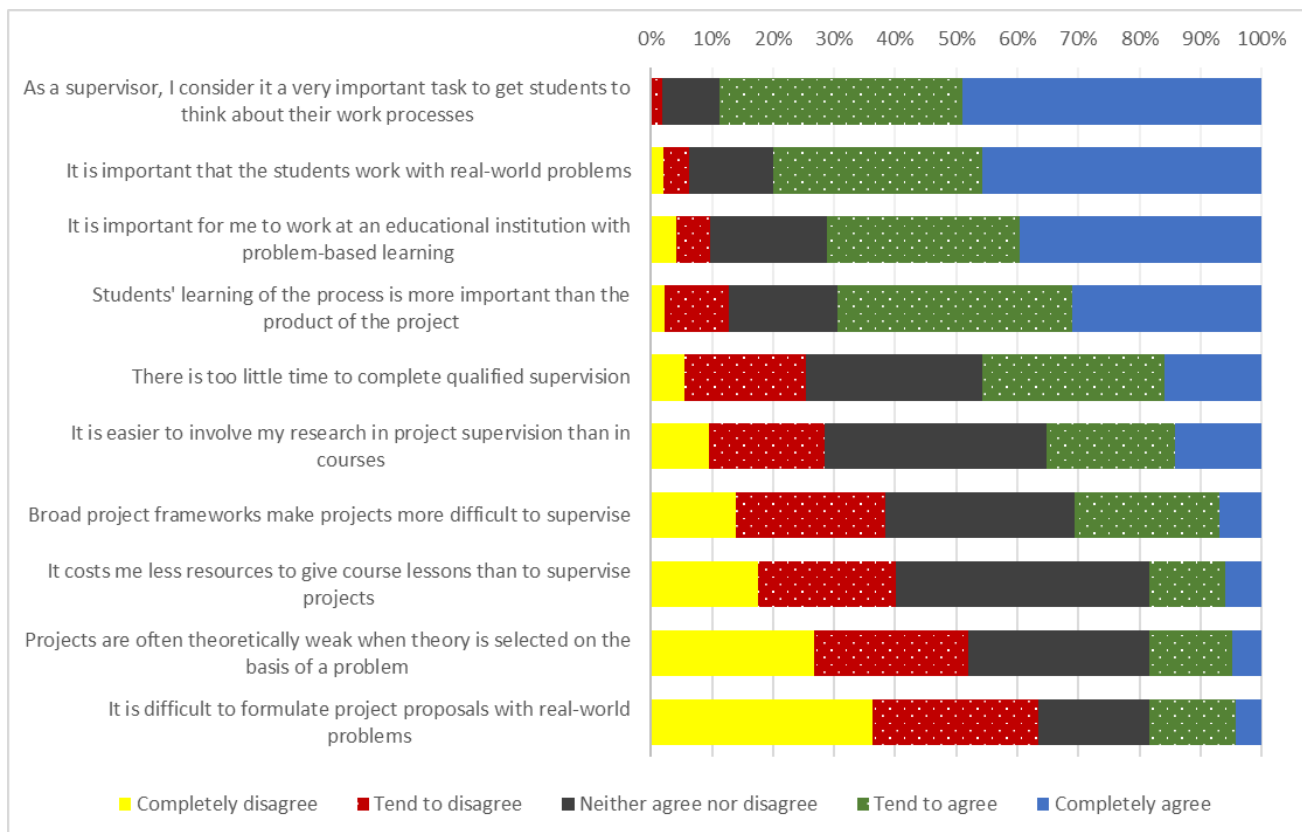
On the other hand, we had expected that courses would cost less time to prepare and run compared to project supervision. More than 1/3 of the respondents disagree on this statement, whereas only a bit more than 20 % tend to agree or completely agree. We had expected an opposite picture as courses are only running for a limited time whereas project supervision counts for an entire semester.

What is also surprising is that not more than 1/3 tend to agree or completely agree that the relation to research is easier for projects than for courses and nearly 1/3 does not find it easier. It is surprising as many project proposals from supervisors actually have a relation to an existing research project – or this is what we had expected.

The respondents were asked: Here are some statements about project supervision. Please indicate to what extent you agree or disagree with each statement?

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
As a supervisor, I consider it a very important task to get students to think about their work processes	2	15	87	372	456
It is important that the students work with real-world problems	20	39	129	320	427
It is important for me to work at an educational institution with problem-based learning	38	52	178	294	370
Students' learning of the process is more important than the product of the project	21	98	165	355	288
There is too little time to complete qualified supervision	52	185	268	278	148
It is easier to involve my research in project supervision than in courses	89	174	338	195	131
Broad project frameworks make projects more difficult to supervise	129	228	287	220	65
It costs me less resources to give course lessons than to supervise projects	163	209	385	116	56
Projects are often theoretically weak when theory is selected on the basis of a problem	248	235	276	127	45
It is difficult to formulate project proposals with real-world problems	337	251	168	131	40

**Table 36: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* All respondents (N: 927 - 935).



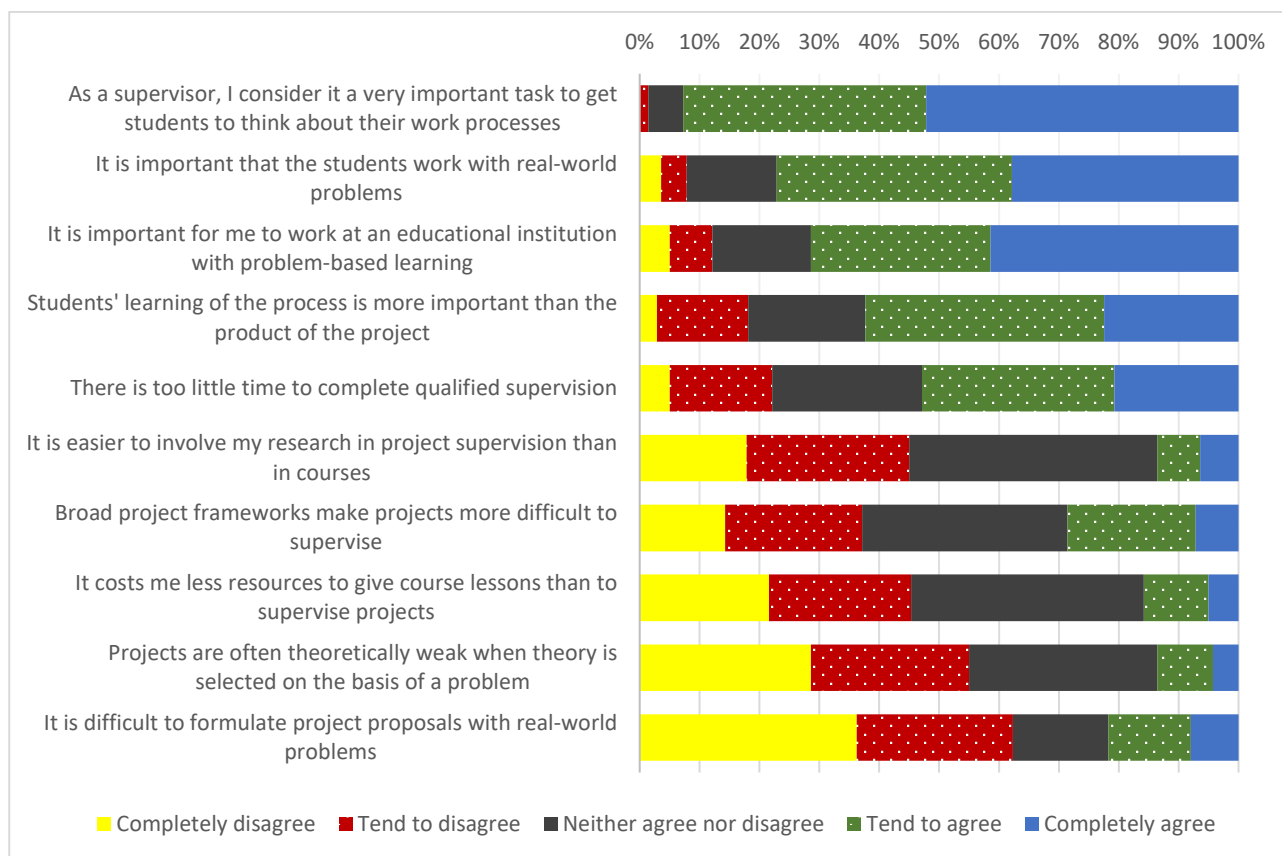
**Figure 30: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* All respondents (N: 927 - 935).



## Cross Faculty departments

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
As a supervisor, I consider it a very important task to get students to think about their work processes	0	2	8	56	72
It is important that the students work with real-world problems	5	6	21	55	53
It is important for me to work at an educational institution with problem-based learning	7	10	23	42	58
Students' learning of the process is more important than the product of the project	4	21	27	55	31
There is too little time to complete qualified supervision	7	24	35	45	29
It is easier to involve my research in project supervision than in courses	25	38	58	10	9
Broad project frameworks make projects more difficult to supervise	20	32	48	30	10
It costs me less resources to give course lessons than to supervise projects	30	33	54	15	7
Projects are often theoretically weak when theory is selected on the basis of a problem	40	37	44	13	6
It is difficult to formulate project proposals with real-world problems	50	36	22	19	11

**Table 37: Answers to question on project supervision: Please indicate to what extent you agree or disagree with each statement? Cross faculty departments (N: 138 - 140).**

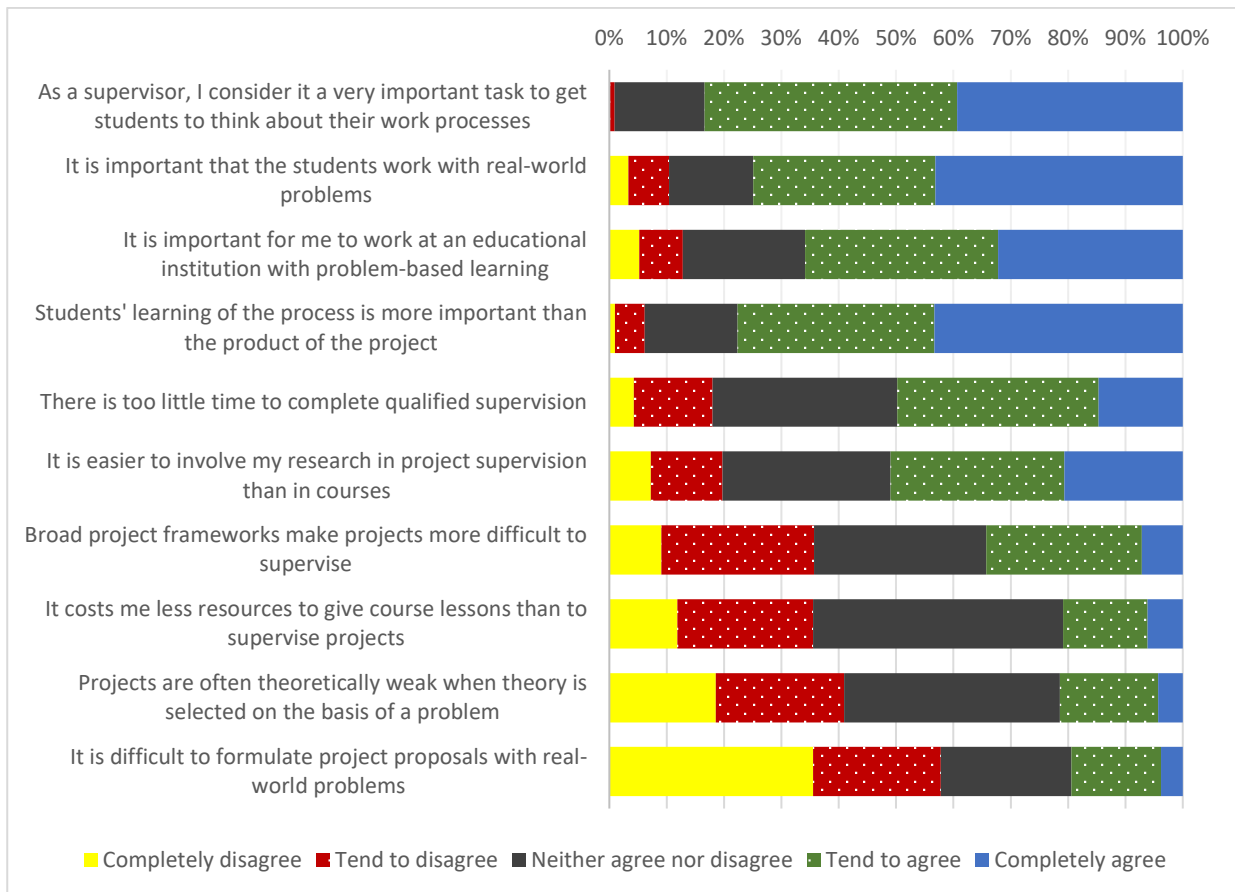


**Figure 31: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* Cross faculty departments (N: 138 - 140).

## Engineering

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
As a supervisor, I consider it a very important task to get students to think about their work processes	0	2	33	93	83
It is important that the students work with real-world problems	7	15	31	67	91
It is important for me to work at an educational institution with problem-based learning	11	16	45	71	68
Students' learning of the process is more important than the product of the project	2	11	34	72	91
There is too little time to complete qualified supervision	9	29	68	74	31
It is easier to involve my research in project supervision than in courses	15	26	61	63	43
Broad project frameworks make projects more difficult to supervise	19	56	63	57	15
It costs me less resources to give course lessons than to supervise projects	25	50	92	31	13
Projects are often theoretically weak when theory is selected on the basis of a problem	39	47	79	36	9
It is difficult to formulate project proposals with real-world problems	75	47	48	33	8

**Table 38: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* Engineering (N: 208 - 211).

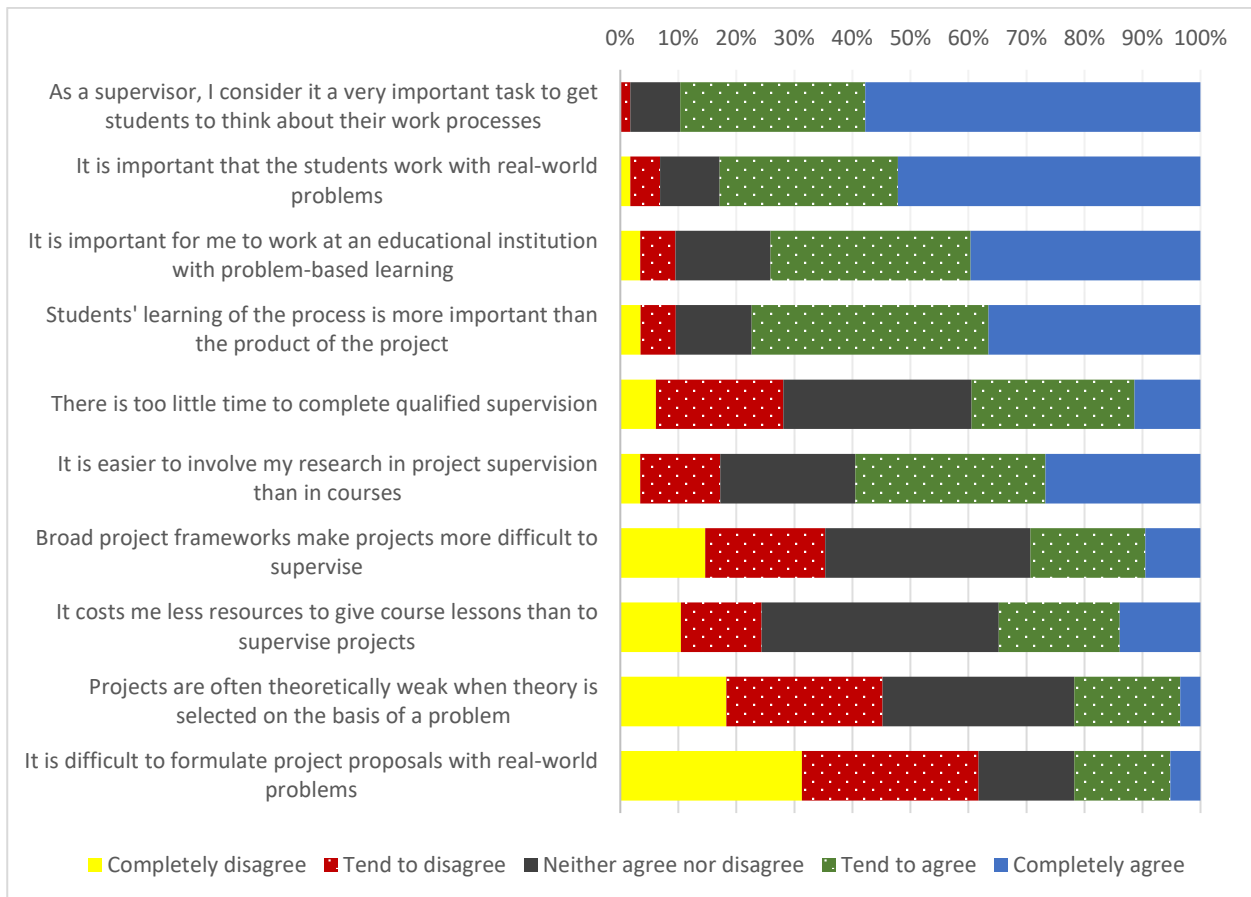


**Figure 32: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* Engineering (N: 208 - 211).

## Health

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
As a supervisor, I consider it a very important task to get students to think about their work processes	0	2	10	37	67
It is important that the students work with real-world problems	2	6	12	36	61
It is important for me to work at an educational institution with problem-based learning	4	7	19	40	46
Students' learning of the process is more important than the product of the project	4	7	15	47	42
There is too little time to complete qualified supervision	7	25	37	32	13
It is easier to involve my research in project supervision than in courses	4	16	27	38	31
Broad project frameworks make projects more difficult to supervise	17	24	41	23	11
It costs me less resources to give course lessons than to supervise projects	12	16	47	24	16
Projects are often theoretically weak when theory is selected on the basis of a problem	21	31	38	21	4
It is difficult to formulate project proposals with real-world problems	36	35	19	19	6

**Table 39: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* Health (N: 114 - 117).

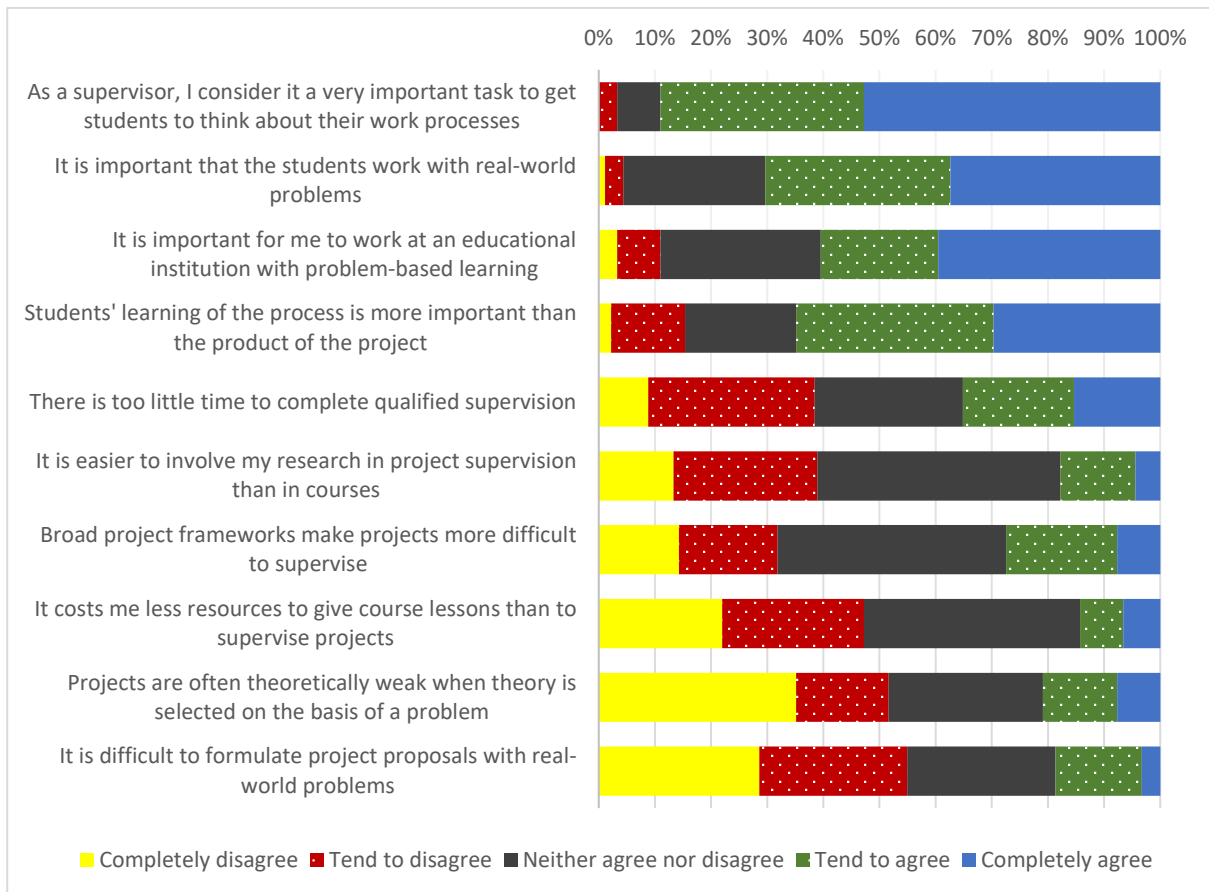


**Figure 33: Answers to question on project supervision: Please indicate to what extent you agree or disagree with each statement? Health (N: 114 - 117).**

## HUM

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
As a supervisor, I consider it a very important task to get students to think about their work processes	0	3	7	33	48
It is important that the students work with real-world problems	1	3	23	30	34
It is important for me to work at an educational institution with problem-based learning	3	7	26	19	36
Students' learning of the process is more important than the product of the project	2	12	18	32	27
There is too little time to complete qualified supervision	8	27	24	18	14
It is easier to involve my research in project supervision than in courses	12	23	39	12	4
Broad project frameworks make projects more difficult to supervise	13	16	37	18	7
It costs me less resources to give course lessons than to supervise projects	20	23	35	7	6
Projects are often theoretically weak when theory is selected on the basis of a problem	32	15	25	12	7
It is difficult to formulate project proposals with real-world problems	26	24	24	14	3

**Table 40: Answers to question on project supervision: Please indicate to what extent you agree or disagree with each statement? HUM (N: 90 - 91).**



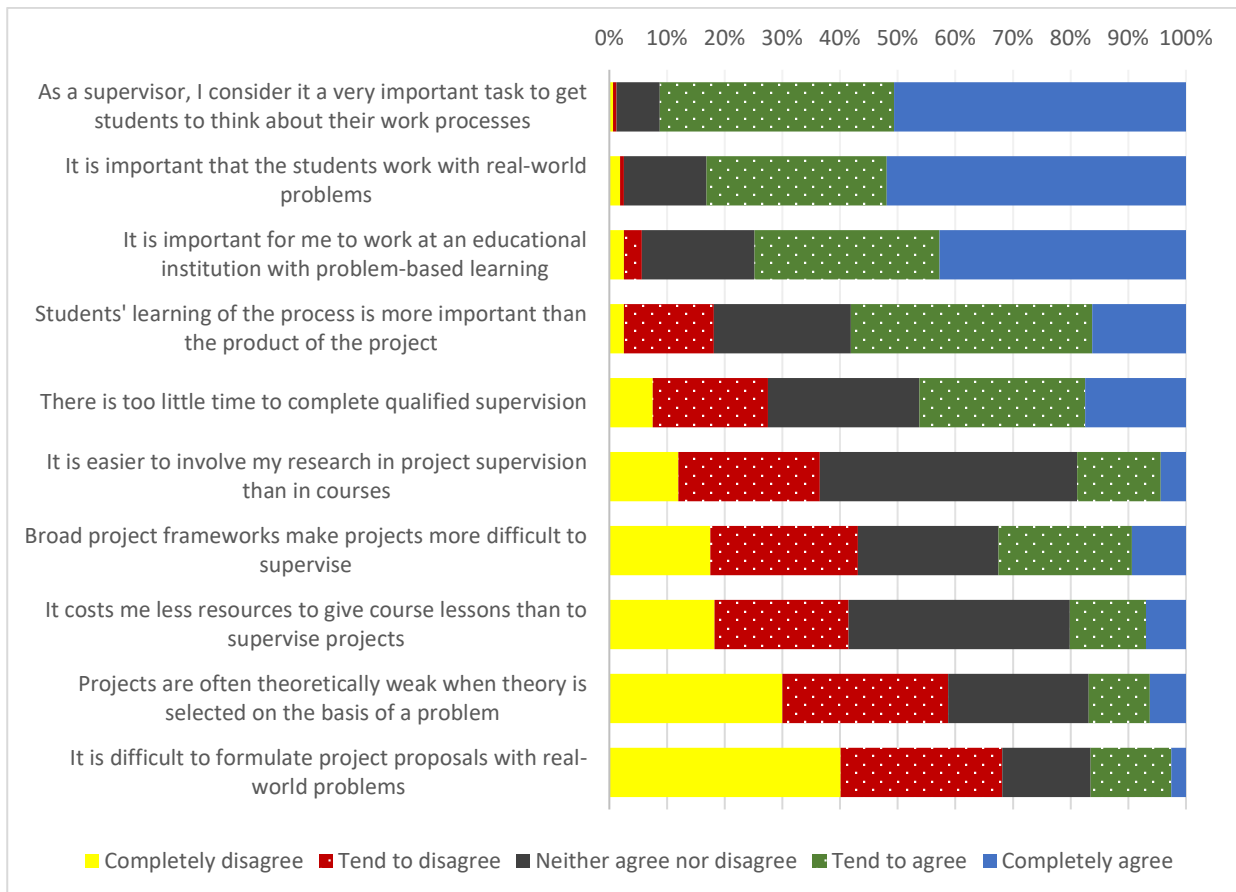
**Figure 34: Answers to question on project supervision: Please indicate to what extent you agree or disagree with each statement? HUM (N: 90 - 91).**



## Social Sciences

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
As a supervisor, I consider it a very important task to get students to think about their work processes	1	1	12	65	81
It is important that the students work with real-world problems	3	1	23	50	83
It is important for me to work at an educational institution with problem-based learning	4	5	31	51	68
Students' learning of the process is more important than the product of the project	4	25	38	67	26
There is too little time to complete qualified supervision	12	32	42	46	28
It is easier to involve my research in project supervision than in courses	19	39	71	23	7
Broad project frameworks make projects more difficult to supervise	28	41	39	37	15
It costs me less resources to give course lessons than to supervise projects	29	37	61	21	11
Projects are often theoretically weak when theory is selected on the basis of a problem	48	46	39	17	10
It is difficult to formulate project proposals with real-world problems	63	44	24	22	4

**Table 41: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* Social Sciences (N: 157 - 160).

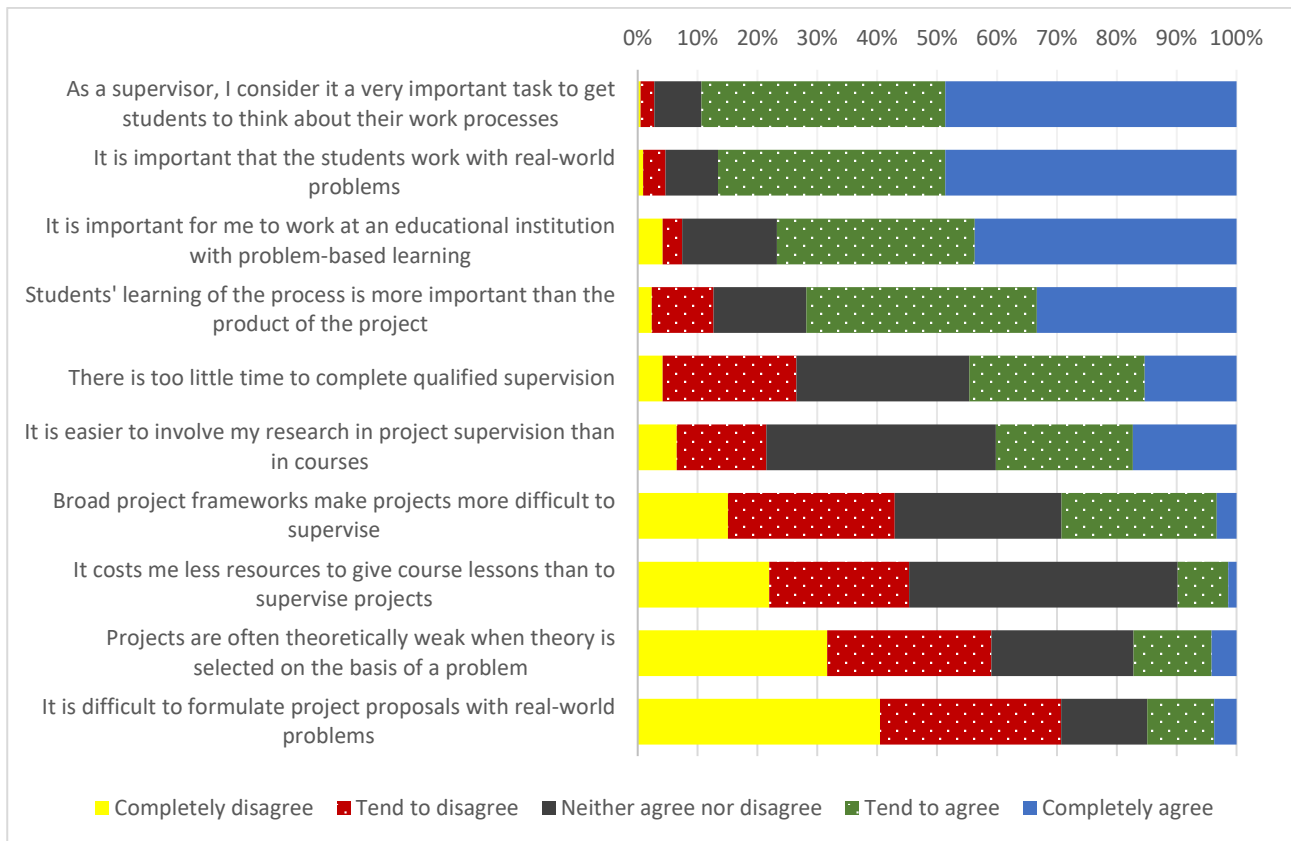


**Figure 35: Answers to question on project supervision:** *Please indicate to what extent you agree or disagree with each statement?* Social Sciences (N: 157 - 160).

## TECH

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
As a supervisor, I consider it a very important task to get students to think about their work processes	1	5	17	88	105
It is important that the students work with real-world problems	2	8	19	82	105
It is important for me to work at an educational institution with problem-based learning	9	7	34	71	94
Students' learning of the process is more important than the product of the project	5	22	33	82	71
There is too little time to complete qualified supervision	9	48	62	63	33
It is easier to involve my research in project supervision than in courses	14	32	82	49	37
Broad project frameworks make projects more difficult to supervise	32	59	59	55	7
It costs me less resources to give course lessons than to supervise projects	47	50	96	18	3
Projects are often theoretically weak when theory is selected on the basis of a problem	68	59	51	28	9
It is difficult to formulate project proposals with real-world problems	87	65	31	24	8

**Table 42: Answers to question on project supervision: Please indicate to what extent you agree or disagree with each statement?** TECH (N: 212 - 216).



**Figure 36: Answers to question on project supervision: Please indicate to what extent you agree or disagree with each statement? TECH (N: 212 - 216).**

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## 8. PROJECTS AND COURSES

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In the construction of the AAU PBL model, both traditional discipline courses taught typically as traditional lectures and the project plays a role. Therefore, there is focus on both the problem-oriented student projects but obligatory and optional courses organized in workshops, lectures, seminars and exercises. Both teaching and learning activities frame student learning in different ways – the courses are meant basically to give overview of the knowledge areas whereas the projects are meant to give students the opportunity for deeper learning. The focus on projects is meant to support the development of student skills such as problem identification, problem analysis, problem formulation, problem solving, communication, cooperation and the evaluation of work processes on top of the often more discipline specific bases of knowledge attained primarily through the courses (Aalborg University, 2015).

The relationship between the projects and the courses are a vital interest for AAU's PBL model and it is one of the most difficult relationships to get to work. The issues are many – either the courses do not support the projects at all – or the timing of the lectures are too early or too late in relation to the students' project process.

An earlier evaluation of the AAU PBL model implemented in 2010 when the project-courses assessed in the projects were transformed into course units with their own assessment raised several issues for the semester coherence and assessment (Kolmos and Holgaard, 2012). This report has given the inspiration to the statements in this question as all dimensions – except for digital learning – were part of the discussion at that time.

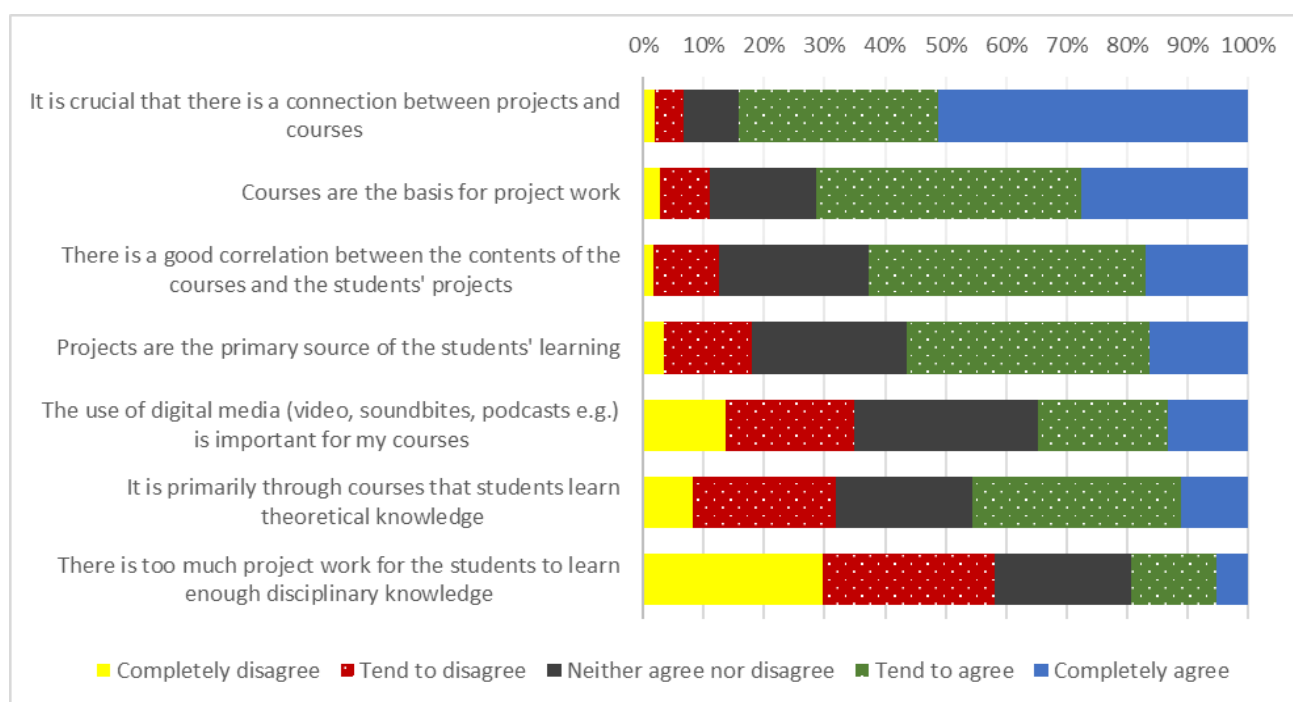
85% of the respondents find it crucial that there is a connection between projects and courses. Around 2/3 of the respondents tend to or completely agree that courses are important and a basis for projects and that there is a good relation between courses and projects and that the projects are the primarily source for students' learning.

Around 20 % find that there is too much project work and that this has an impact on the learning of disciplinary knowledge. In general, the results indicate the respondents find projects very important for students' learning, however there should be a clear relation to the courses.

The respondents were asked: During the following questions, you will be asked to submit your opinion on a number of statements on projects and courses. Courses in this context is understood as the teaching given aside from the project work, for example lectures, exercises, group lessons or laboratory instruction. Please indicate to what extent you agree or disagree with each statement.

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
It is crucial that there is a connection between projects and courses	19	46	90	319	500
Courses are the basis for project work	27	80	170	422	266
There is a good correlation between the contents of the courses and the students' projects	17	106	240	444	165
Projects are the primary source of the students' learning	34	142	247	392	158
The use of digital media (video, soundbites, podcasts e.g.) is important for my courses	133	207	294	209	129
It is primarily through courses that students learn theoretical knowledge	80	230	218	333	109
There is too much project work for the students to learn enough disciplinary knowledge	289	279	219	139	51

**Table 43: Answer to question on relation between courses and projects:** *Please indicate to what extent you agree or disagree with each statement.* All respondents (N: 965 - 977).

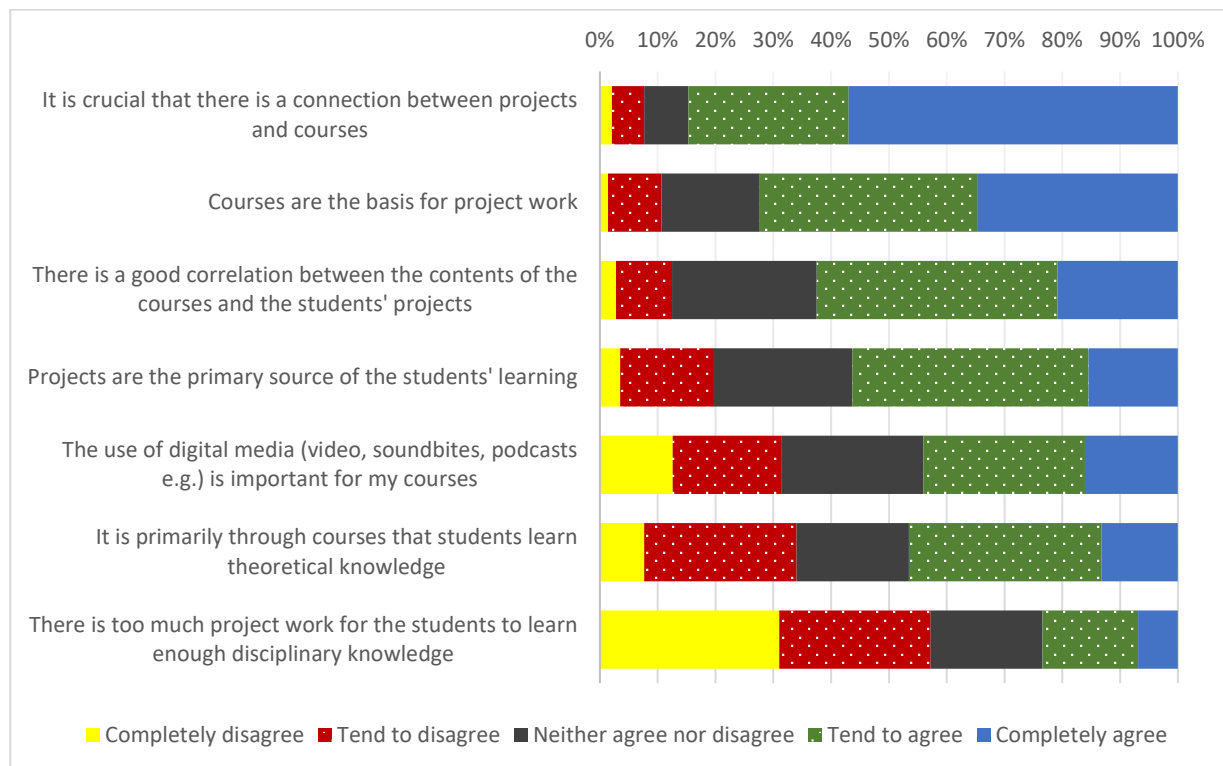


**Figure 37: Answer to question on relation between courses and projects:** *Please indicate to what extent you agree or disagree with each statement.* All respondents (N: 965 - 977).

## Cross Faculty departments

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
It is crucial that there is a connection between projects and courses	3	8	11	40	82
Courses are the basis for project work	2	13	24	53	49
There is a good correlation between the contents of the courses and the students' projects	4	14	36	60	30
Projects are the primary source of the students' learning	5	23	34	58	22
The use of digital media (video, soundbites, podcasts e.g.) is important for my courses	18	27	35	40	23
It is primarily through courses that students learn theoretical knowledge	11	38	28	48	19
There is too much project work for the students to learn enough disciplinary knowledge	45	38	28	24	10

**Table 44: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Cross faculty departments (N: 141 - 145).

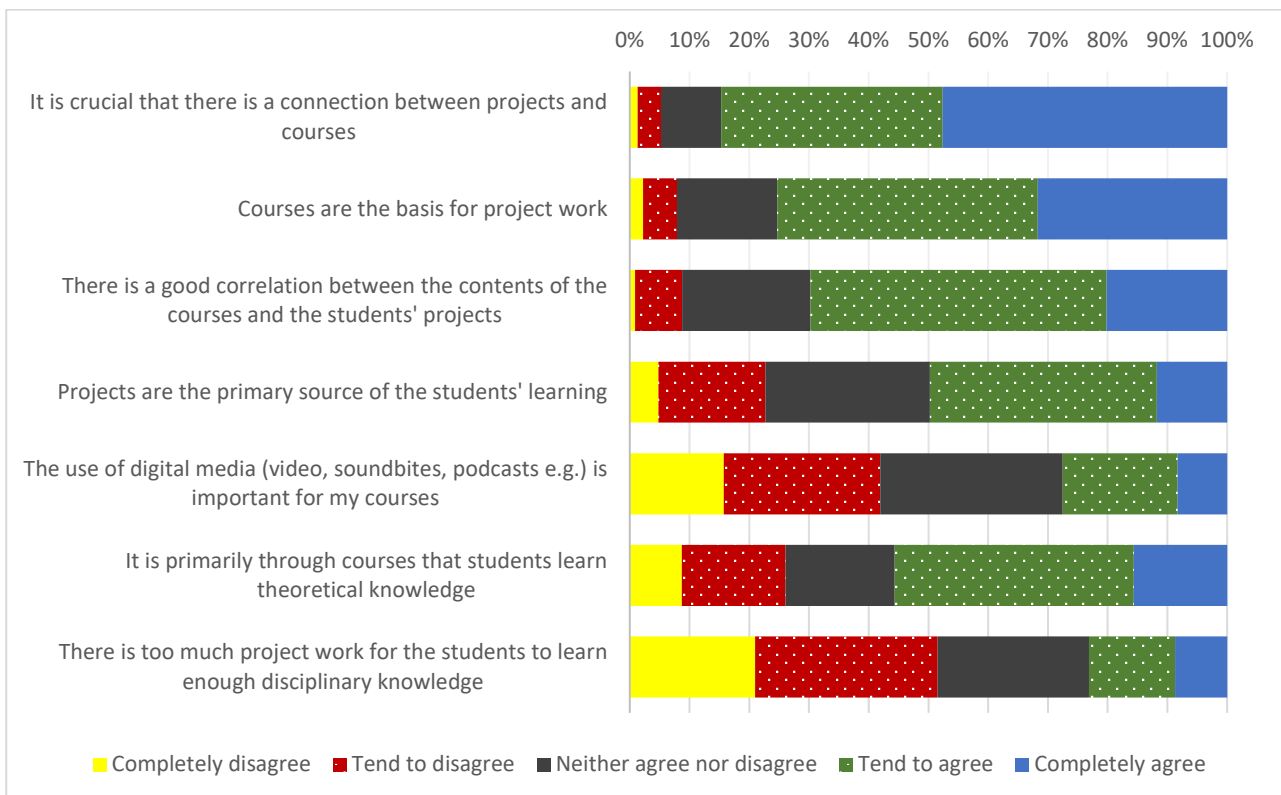


**Figure 38: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Cross faculty departments (N: 141 - 145).

## Engineering

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
It is crucial that there is a connection between projects and courses	3	9	23	85	109
Courses are the basis for project work	5	13	38	99	72
There is a good correlation between the contents of the courses and the students' projects	2	18	49	113	46
Projects are the primary source of the students' learning	11	41	63	87	27
The use of digital media (video, soundbites, podcasts e.g.) is important for my courses	36	60	70	44	19
It is primarily through courses that students learn theoretical knowledge	20	40	42	92	36
There is too much project work for the students to learn enough disciplinary knowledge	48	70	58	33	20

**Table 45: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Engineering (N: 227 - 230).



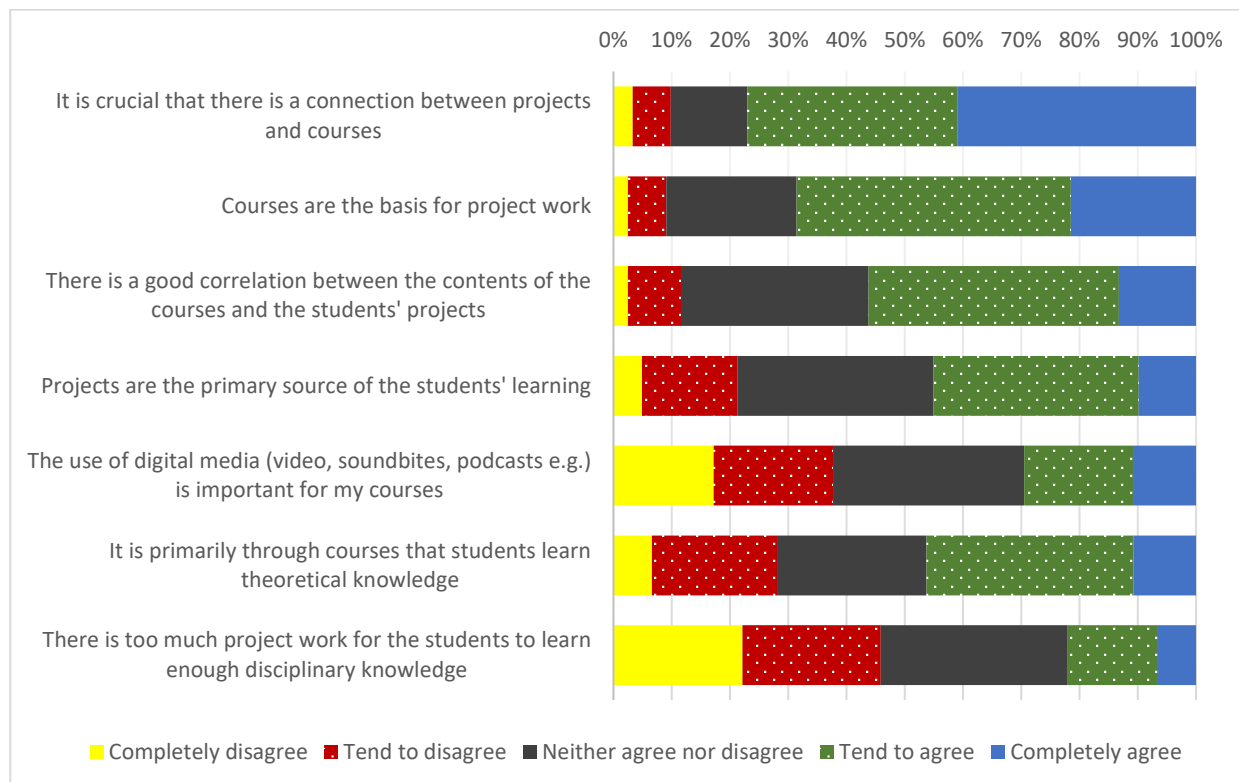
**Figure 39: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Engineering (N: 227 - 230).



## Health

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
It is crucial that there is a connection between projects and courses	4	8	16	44	50
Courses are the basis for project work	3	8	27	57	26
There is a good correlation between the contents of the courses and the students' projects	3	11	39	52	16
Projects are the primary source of the students' learning	6	20	41	43	12
The use of digital media (video, soundbites, podcasts e.g.) is important for my courses	21	25	40	23	13
It is primarily through courses that students learn theoretical knowledge	8	26	31	43	13
There is too much project work for the students to learn enough disciplinary knowledge	27	29	39	19	8

**Table 46: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Health (N: 121 - 122).

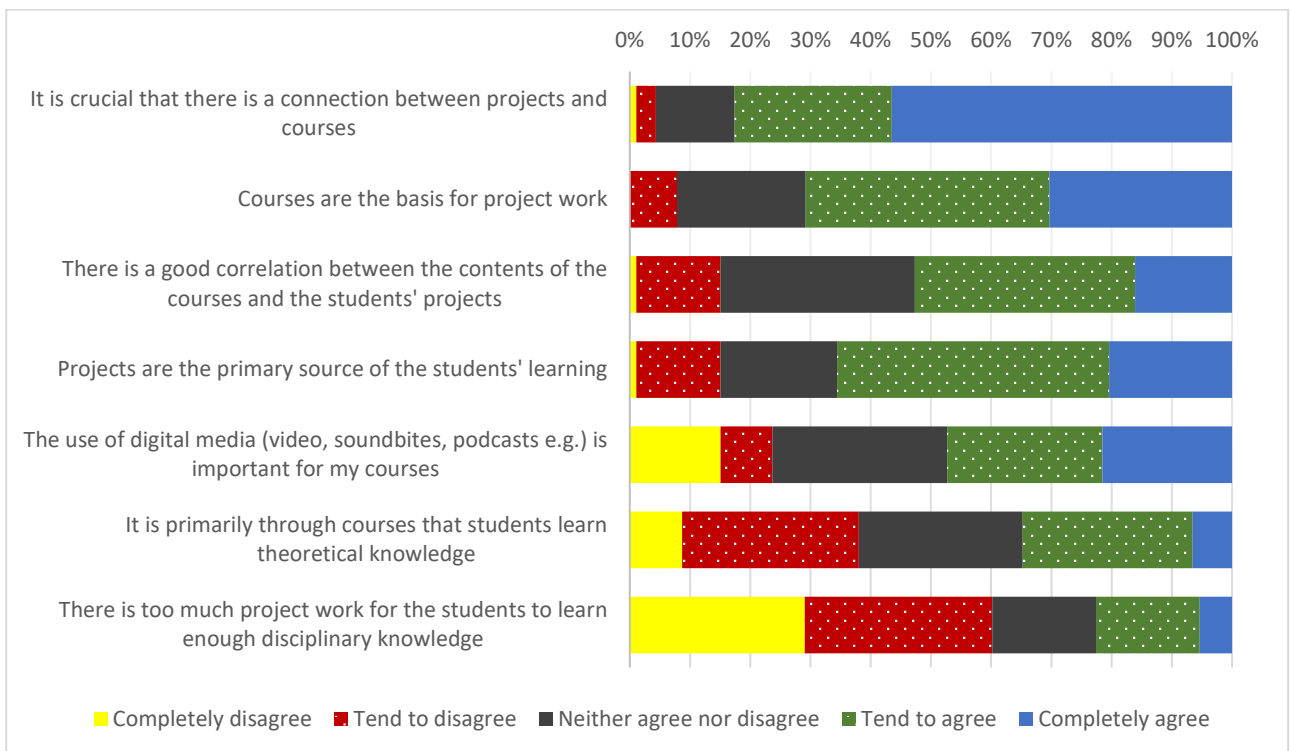


**Figure 40: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Health (N: 121 - 122).

## HUM

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
It is crucial that there is a connection between projects and courses	1	3	12	24	52
Courses are the basis for project work	0	7	19	36	27
There is a good correlation between the contents of the courses and the students' projects	1	13	30	34	15
Projects are the primary source of the students' learning	1	13	18	42	19
The use of digital media (video, soundbites, podcasts e.g.) is important for my courses	14	8	27	24	20
It is primarily through courses that students learn theoretical knowledge	8	27	25	26	6
There is too much project work for the students to learn enough disciplinary knowledge	27	29	16	16	5

**Table 47: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. HUM (N: 89 - 93).

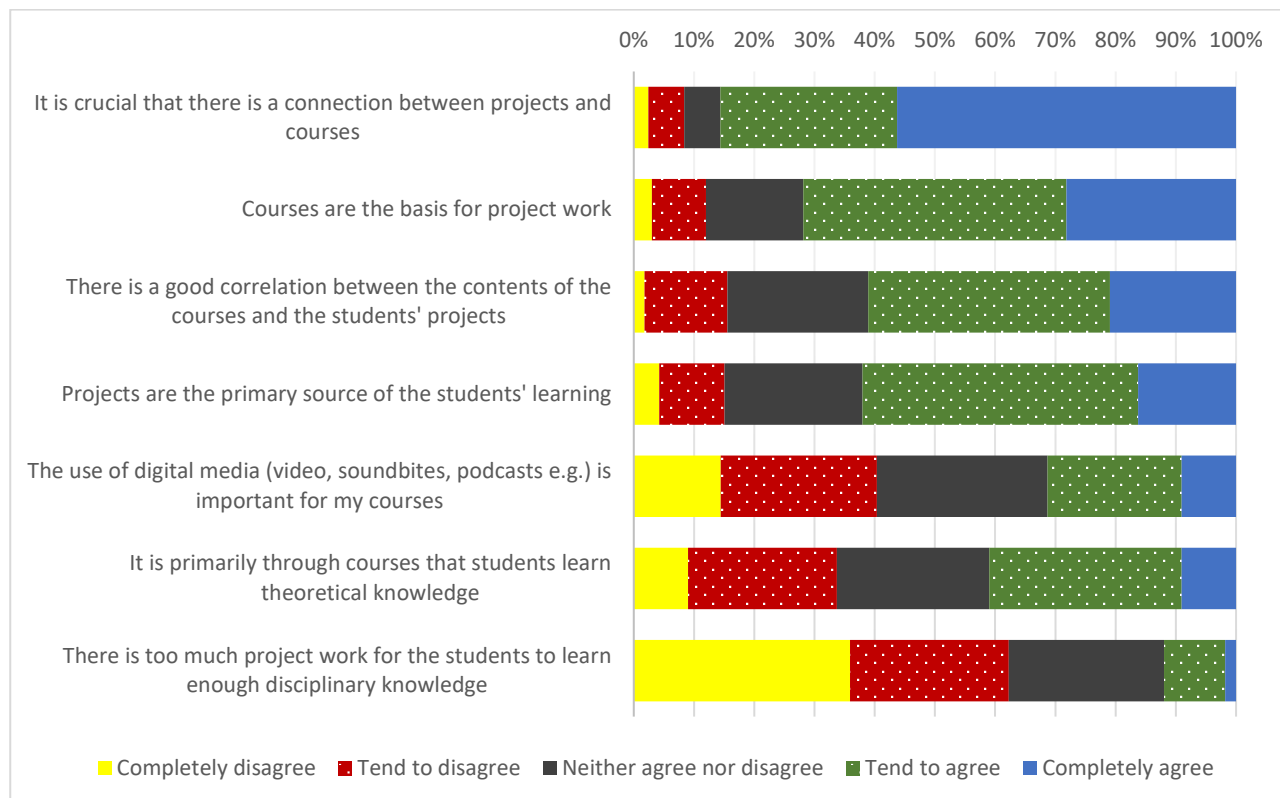


**Figure 41: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. HUM (N: 89 - 93).

## Social Sciences

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
It is crucial that there is a connection between projects and courses	4	10	10	49	94
Courses are the basis for project work	5	15	27	73	47
There is a good correlation between the contents of the courses and the students' projects	3	23	39	67	35
Projects are the primary source of the students' learning	7	18	38	76	27
The use of digital media (video, soundbites, podcasts e.g.) is important for my courses	24	43	47	37	15
It is primarily through courses that students learn theoretical knowledge	15	41	42	53	15
There is too much project work for the students to learn enough disciplinary knowledge	60	44	43	17	3

**Table 48: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Social Sciences (N: 166 - 167).

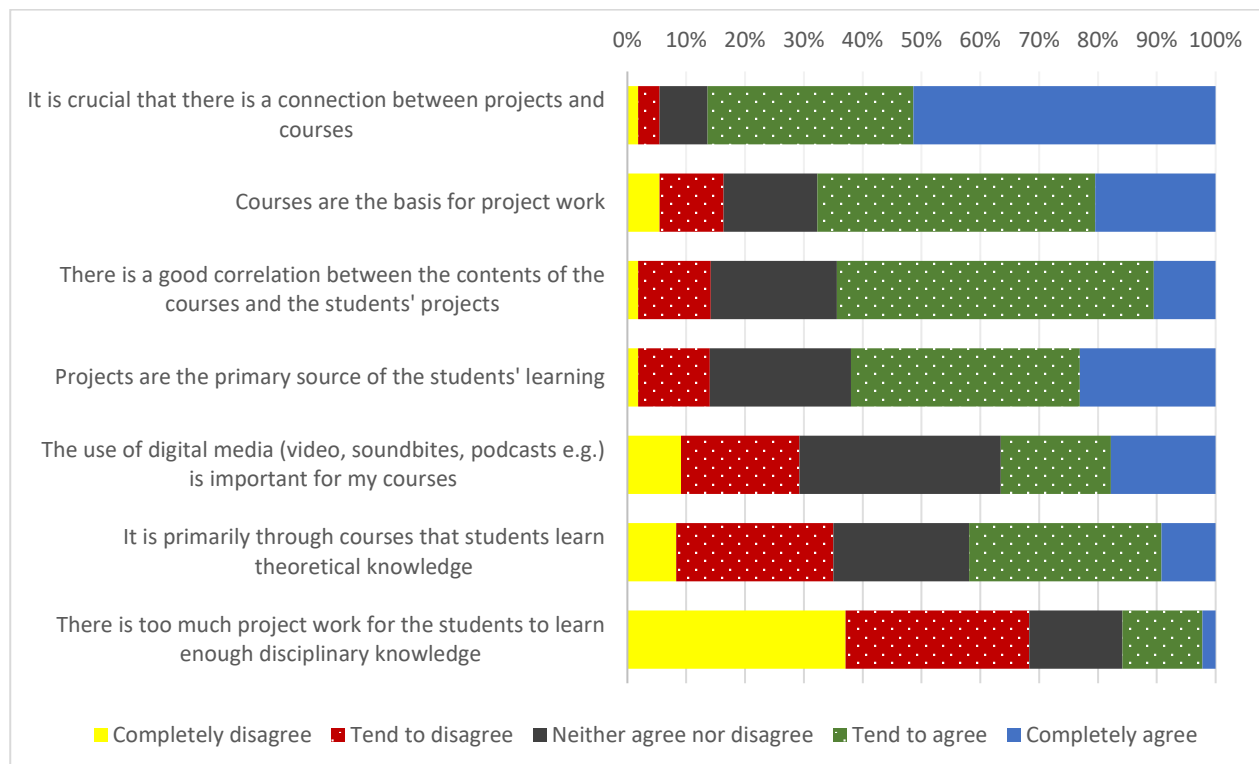


**Figure 42: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. Social Sciences (N: 166 - 167).

## TECH

	Completely disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Completely agree
It is crucial that there is a connection between projects and courses	4	8	18	77	113
Courses are the basis for project work	12	24	35	104	45
There is a good correlation between the contents of the courses and the students' projects	4	27	47	118	23
Projects are the primary source of the students' learning	4	27	53	86	51
The use of digital media (video, soundbites, podcasts e.g.) is important for my courses	20	44	75	41	39
It is primarily through courses that students learn theoretical knowledge	18	58	50	71	20
There is too much project work for the students to learn enough disciplinary knowledge	82	69	35	30	5

**Table 49: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. TECH (N: 217 - 221).



**Figure 43: Answer to question on relation between courses and projects:** Please indicate to what extent you agree or disagree with each statement. TECH (N: 217 - 221).

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## 9. FUTURE AAU MODEL

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In the PBL-Future project we are going to point out some possible directions for PBL. We will be applying various methods for collecting data such as interviews, workshops and questionnaires. In this questionnaire we have formulated nine single elements for possible future development. Based on the PBL learning principles and present trends at AAU, we identified series of tensions:

- Individual versus group based
- Interdisciplinary versus disciplinary approach
- Theory versus relation to practice
- Coherent semester versus single independent curriculum elements
- Digitalization possibilities of learning versus face-to-face

These dimensions ended up in a long list of variables and we had to decrease the number of items with still having the dimensions in mind and at least have one item per dimension.

In general, around 1/3 has answered somewhat important to all the items, so it is more the extremes which are interesting to look at.

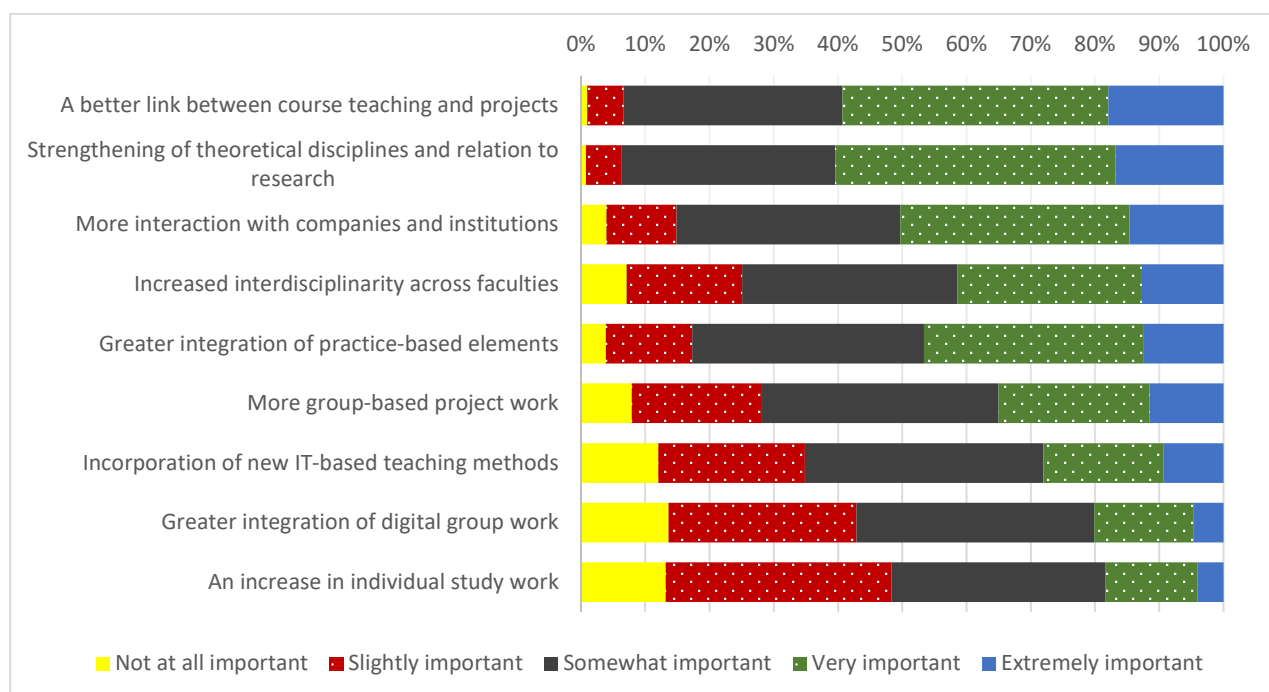
For extremely important and very important, around half of the academic staff at three results across the five faculties would prefer to see a better link among courses and projects and strengthening the theoretical disciplines and relation to research. This can be interpreted as a wish for more coherence – partly coherence in the curriculum, partly coherence with academic staff's research projects. Around half of the respondents value more interdisciplinary approaches and more practice elements.

What seems to be less important for the respondents are individual study work and IT and digitalization of teaching and learning methods as around 1/3 see this as less or slightly important. With the new PBL-digital project at AAU, this is an important element to consider when implementing more digital learning in the PBL curriculum – and the motivation does not derive from digital learning, but much more from coherence in the curriculum.

The respondents were asked: Which of the following elements do you think should be important priorities in the development of the AAU model of the future?

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
A better link between course teaching and projects	9	52	311	379	164
Strengthening of theoretical disciplines and relation to research	7	51	304	399	154
More interaction with companies and institutions	36	100	318	326	134
Increased interdisciplinarity across faculties	65	164	306	263	116
Greater integration of practice-based elements	35	123	329	312	113
More group-based project work	72	184	338	215	105
Incorporation of new IT-based teaching methods	110	208	339	171	85
Greater integration of digital group work	124	266	337	141	42
An increase in individual study work	121	323	305	132	37

**Table 50: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future?** All respondents (N: 910 - 918).

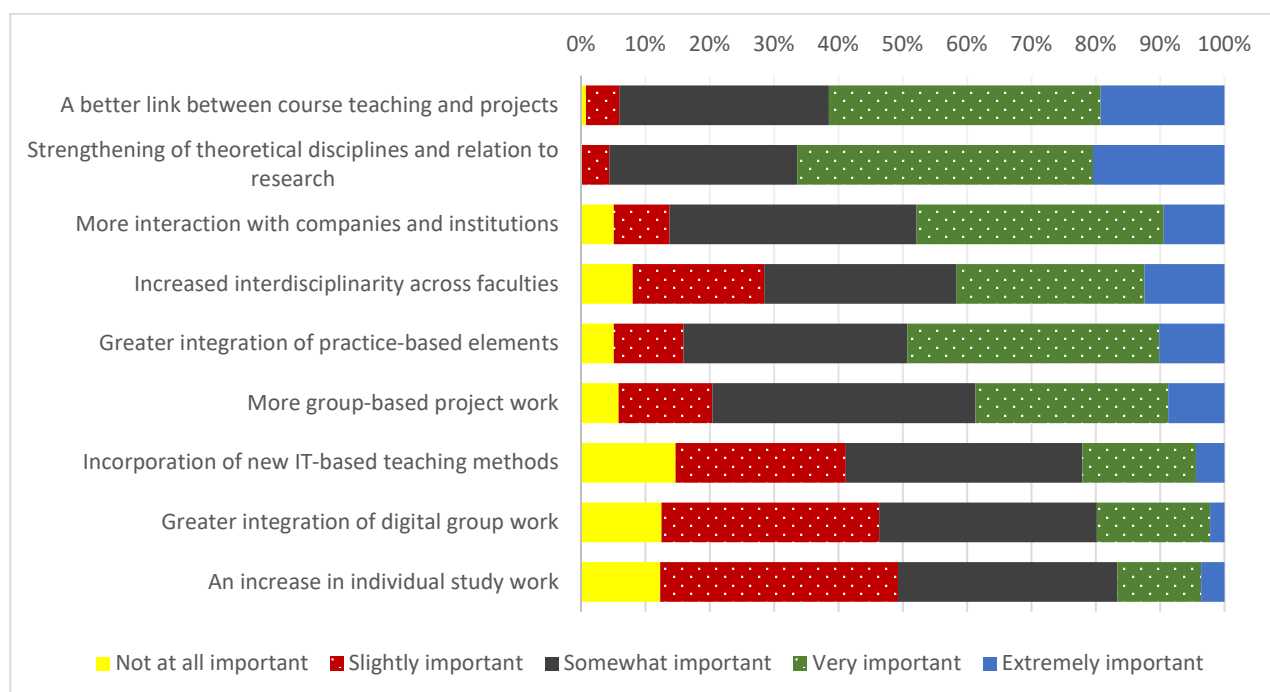


**Figure 44: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future?** All respondents (N: 910 - 918).

## Cross Faculty departments

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
A better link between course teaching and projects	1	7	44	57	26
Strengthening of theoretical disciplines and relation to research	0	6	40	63	28
More interaction with companies and institutions	7	12	53	53	13
Increased interdisciplinarity across faculties	11	28	41	40	17
Greater integration of practice-based elements	7	15	48	54	14
More group-based project work	8	20	56	41	12
Incorporation of new IT-based teaching methods	20	36	50	24	6
Greater integration of digital group work	17	46	46	24	3
An increase in individual study work	17	51	47	18	5

**Table 51: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Cross faculty departments (N: 135 - 138).**

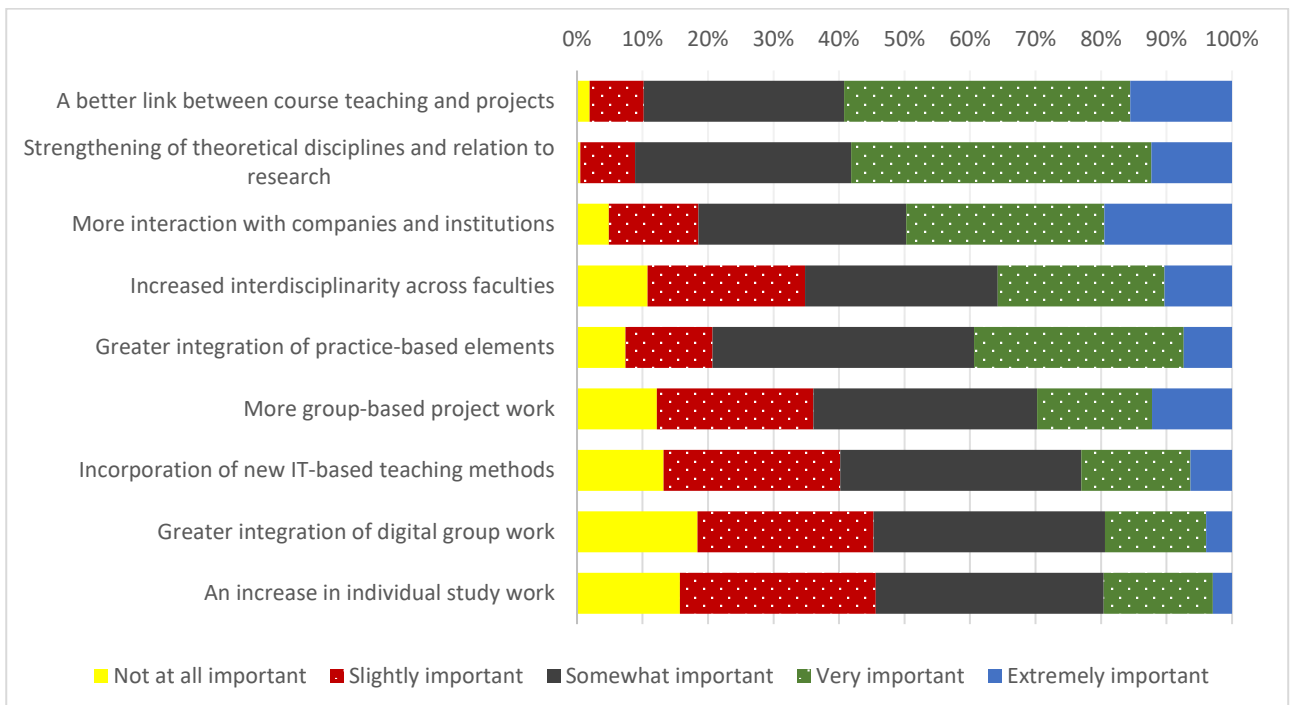


**Figure 45: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Cross faculty departments (N: 135 - 138).**

## Engineering

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
A better link between course teaching and projects	4	17	63	90	32
Strengthening of theoretical disciplines and relation to research	1	17	67	93	25
More interaction with companies and institutions	10	28	65	62	40
Increased interdisciplinarity across faculties	22	49	60	52	21
Greater integration of practice-based elements	15	27	81	65	15
More group-based project work	25	49	70	36	25
Incorporation of new IT-based teaching methods	27	55	75	34	13
Greater integration of digital group work	37	54	71	31	8
An increase in individual study work	32	61	71	34	6

**Table 52: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Engineering (N: 201 - 206).**



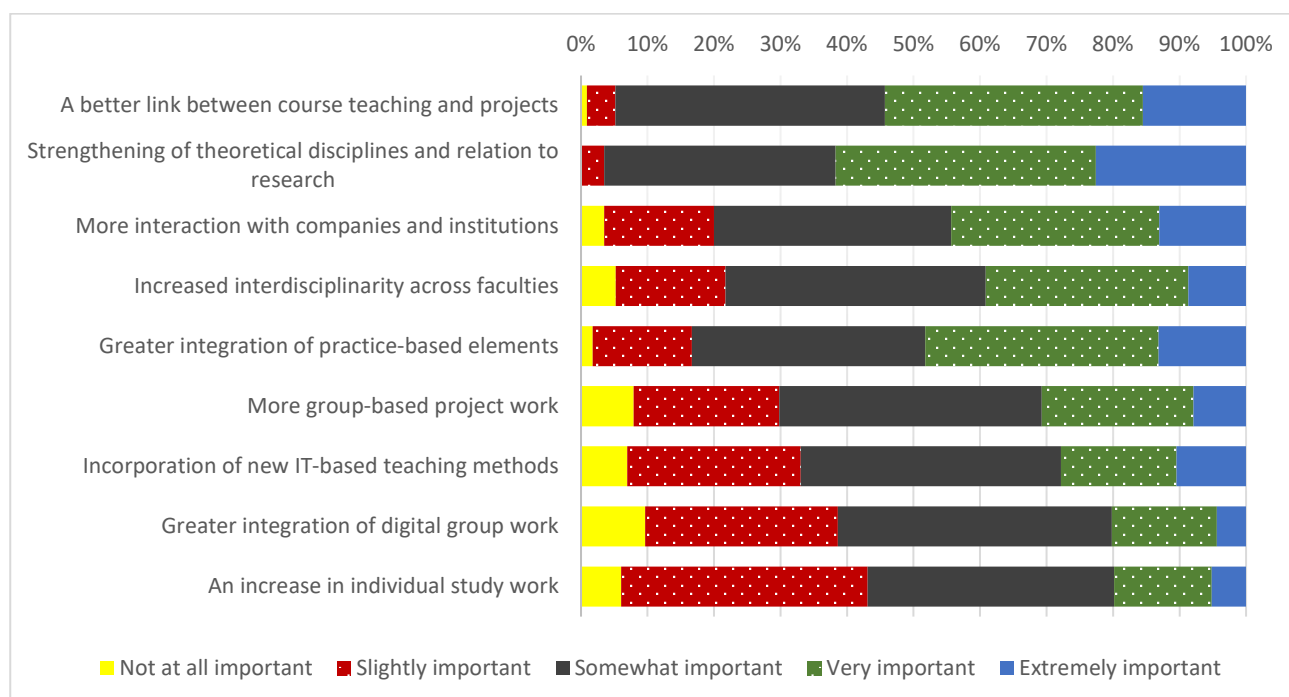
**Figure 46: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Engineering (N: 201 - 206).**



## Health

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
A better link between course teaching and projects	1	5	47	45	18
Strengthening of theoretical disciplines and relation to research	0	4	40	45	26
More interaction with companies and institutions	4	19	41	36	15
Increased interdisciplinarity across faculties	6	19	45	35	10
Greater integration of practice-based elements	2	17	40	40	15
More group-based project work	9	25	45	26	9
Incorporation of new IT-based teaching methods	8	30	45	20	12
Greater integration of digital group work	11	33	47	18	5
An increase in individual study work	7	43	43	17	6

**Table 53: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Health (N: 114 – 116).**

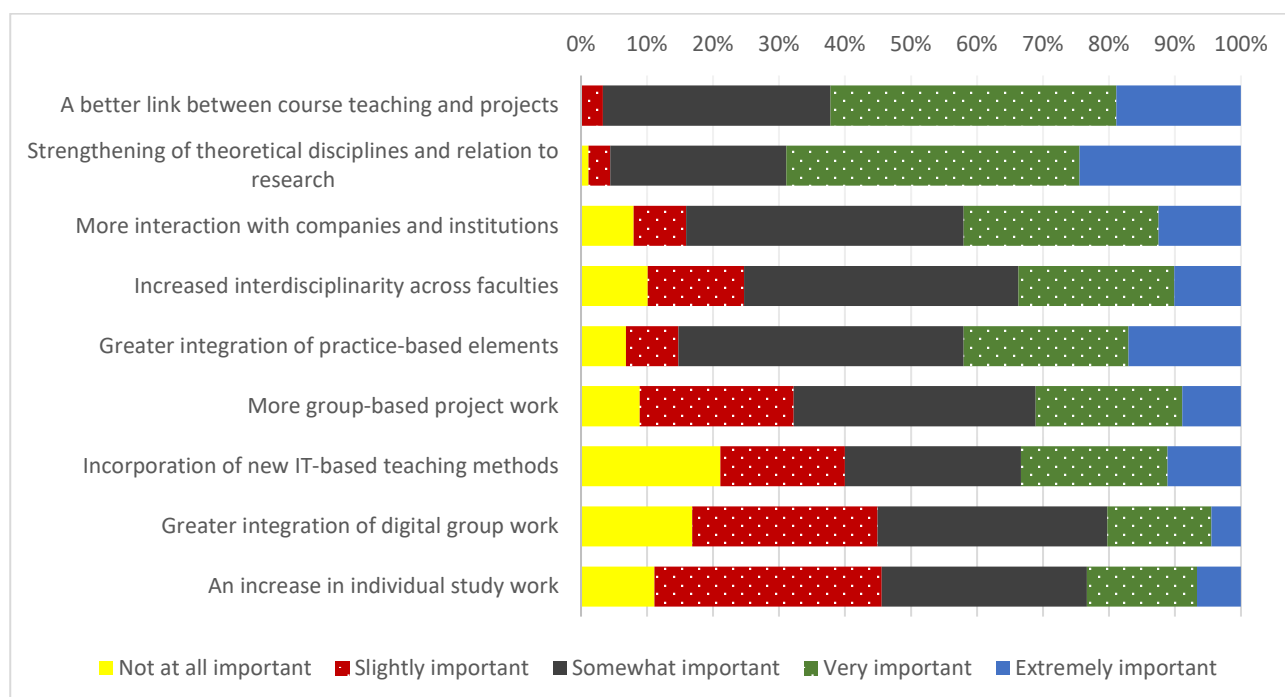


**Figure 47: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Health (N: 114 – 116).**

## HUM

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
A better link between course teaching and projects	0	3	31	39	17
Strengthening of theoretical disciplines and relation to research	1	3	24	40	22
More interaction with companies and institutions	7	7	37	26	11
Increased interdisciplinarity across faculties	9	13	37	21	9
Greater integration of practice-based elements	6	7	38	22	15
More group-based project work	8	21	33	20	8
Incorporation of new IT-based teaching methods	19	17	24	20	10
Greater integration of digital group work	15	25	31	14	4
An increase in individual study work	10	31	28	15	6

**Table 54: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? HUM (N: 88 - 90).**

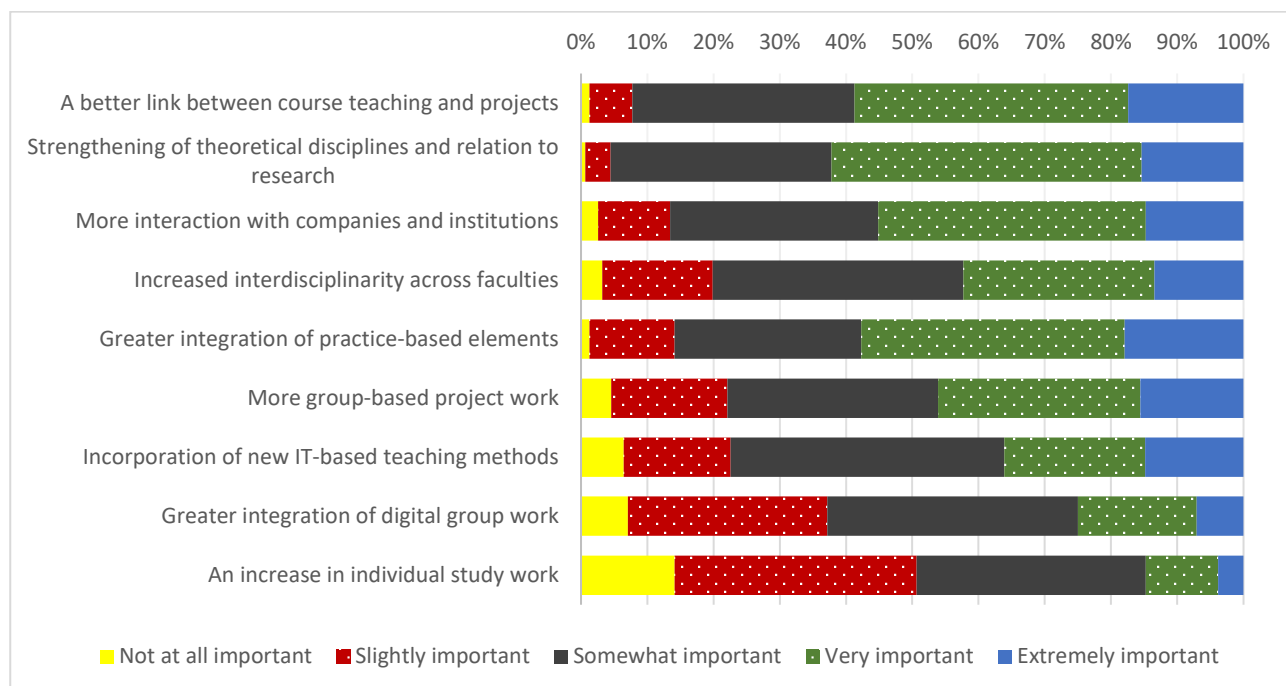


**Figure 48: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? HUM (N: 88 - 90).**

## Social Sciences

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
A better link between course teaching and projects	2	10	52	64	27
Strengthening of theoretical disciplines and relation to research	1	6	52	73	24
More interaction with companies and institutions	4	17	49	63	23
Increased interdisciplinarity across faculties	5	26	59	45	21
Greater integration of practice-based elements	2	20	44	62	28
More group-based project work	7	27	49	47	24
Incorporation of new IT-based teaching methods	10	25	64	33	23
Greater integration of digital group work	11	47	59	28	11
An increase in individual study work	22	57	54	17	6

**Table 55: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Social Sciences (N: 154 - 156).**

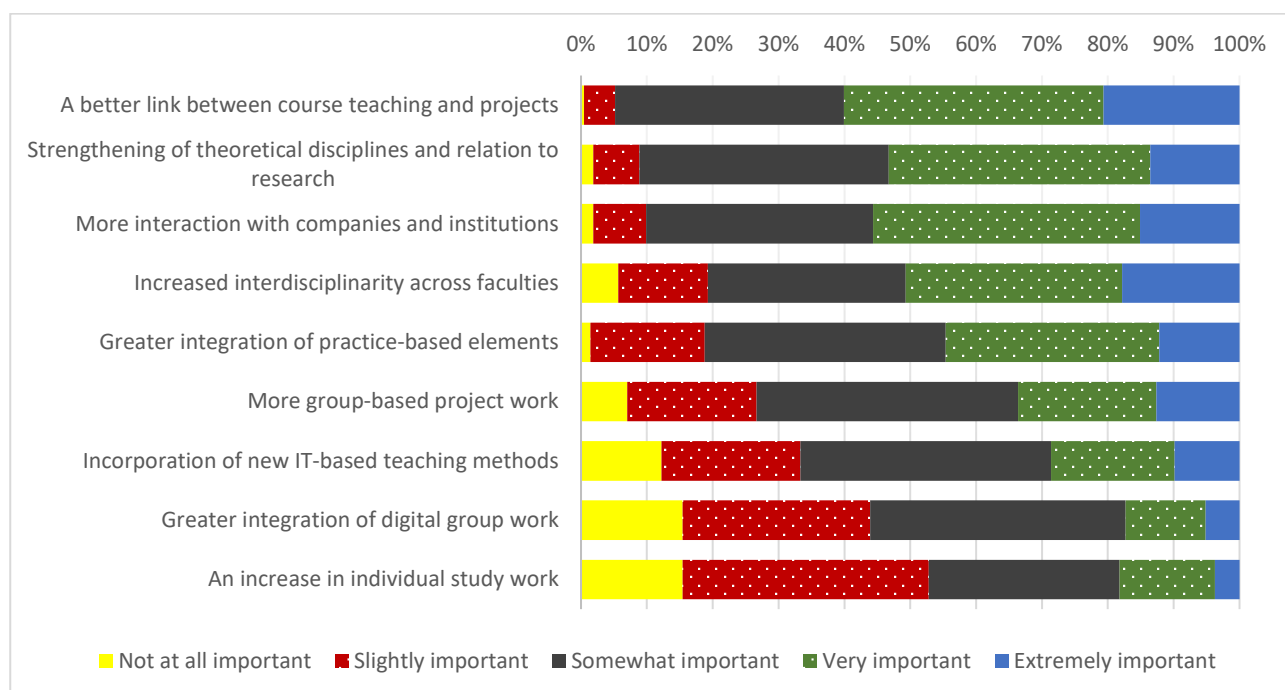


**Figure 49: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? Social Sciences (N: 154 - 156).**

## TECH

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
A better link between course teaching and projects	1	10	74	84	44
Strengthening of theoretical disciplines and relation to research	4	15	81	85	29
More interaction with companies and institutions	4	17	73	86	32
Increased interdisciplinarity across faculties	12	29	64	70	38
Greater integration of practice-based elements	3	37	78	69	26
More group-based project work	15	42	85	45	27
Incorporation of new IT-based teaching methods	26	45	81	40	21
Greater integration of digital group work	33	61	83	26	11
An increase in individual study work	33	80	62	31	8

**Table 56: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? TECH (N: 212 - 214).**



**Figure 50: Answer to the question: Which of the following elements do you think should be important priorities in the development of the AAU model of the future? TECH (N: 212 - 214).**

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## REFERENCES

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Aalborg University (2015) Problem-Based Learning - learning principles of the Aalborg model, Aalborg University. doi: 10.1017/CBO9781139519526.019.

Strobel, J. and van Barneveld, A. (2009) 'When is PBL more effective? A meta-synthesis of meta-analyses comparing PBL to conventional classrooms', *Interdisciplinary Journal of Problem-based Learning*, 3(1), p. 4.

Kolmos, A. and Bylov, S. (2016) PROCEED-2-WORK Arbejdsrapport 1 - Ingeniørstuderendes forventning og parathed til det kommende arbejdsliv.

Kolmos, A. and Graaff, E. d. (2014) 'Problem-Based and Project-Based Learning in Engineering Education: Merging Models', in Olds, B. M. and Johri, A. (eds) *Cambridge Handbook of Engineering Education Research*. New York, NY, USA: Cambridge University Press., p. 141–161.

Kolmos, A., & Holgaard, J. E. (2007). Situationsbaseret projektvejledning. DUT, Dansk Universitetspædagogisk Tidsskrift, 2(3), 54-62.

Kolmos, A. and Holgaard, J. E. (2012) Evaluering af ændringerne i PBL modellen på TEKNAT AAU. UCPBL UNESCO Chair in Problem Based Learning. Available at: <http://www.ucpbl.net/Reports%2C+Videos+and+Promotion/Working+Papers/>.

Kolmos, A. and Koretke, B. (2016) PROCEED-2-WORK Arbejdsrapport 2 - AAU teknisk-naturvidenskabelige studerendes forventning og parathed til det kommende arbejdsliv.

OECD (2014) 'Competency Framework', *Talent.oecd*, (October), p. 22. doi: 10.1016/j.talanta.2009.11.058.

UNESCO (2016) UNESCO Competency Framework. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000245056> (Accessed: 18 March 2019).