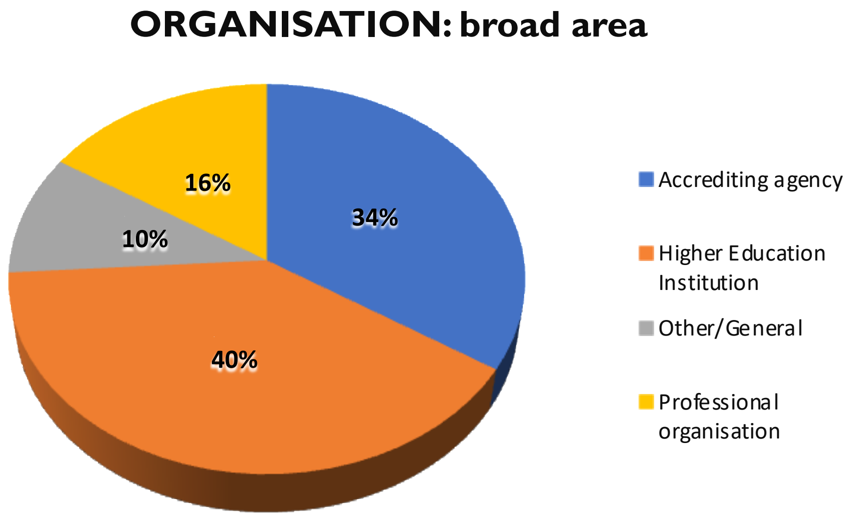
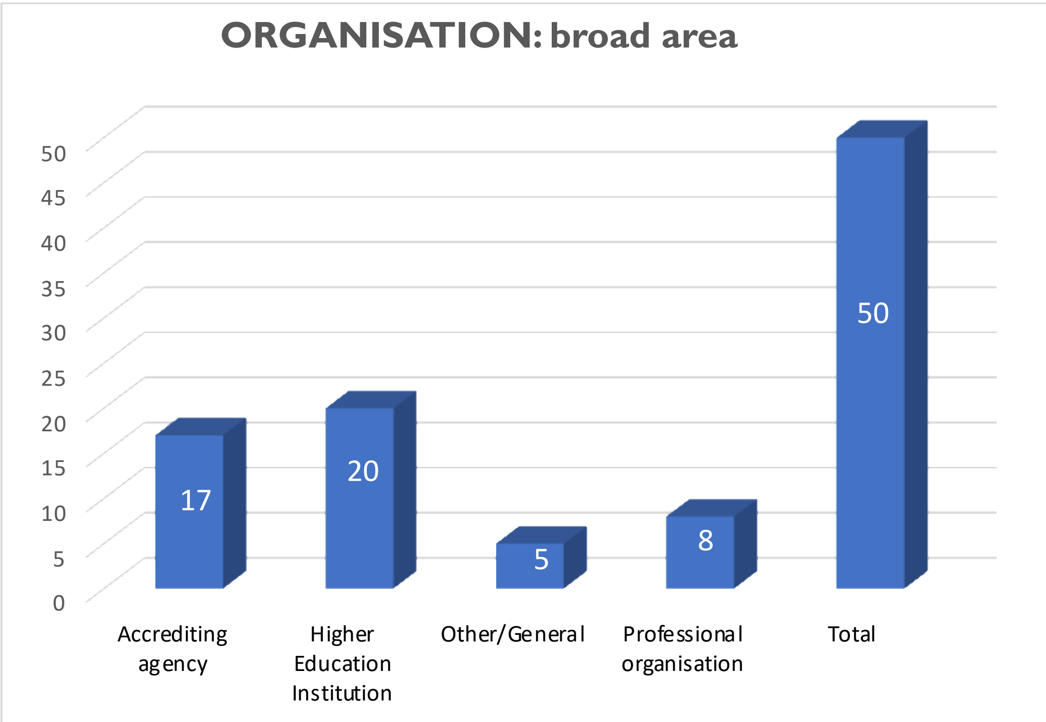
ENAEE SURVEY RESULTS 2021

1 PARTICIPATING ORGANISATIONS BROAD AREA

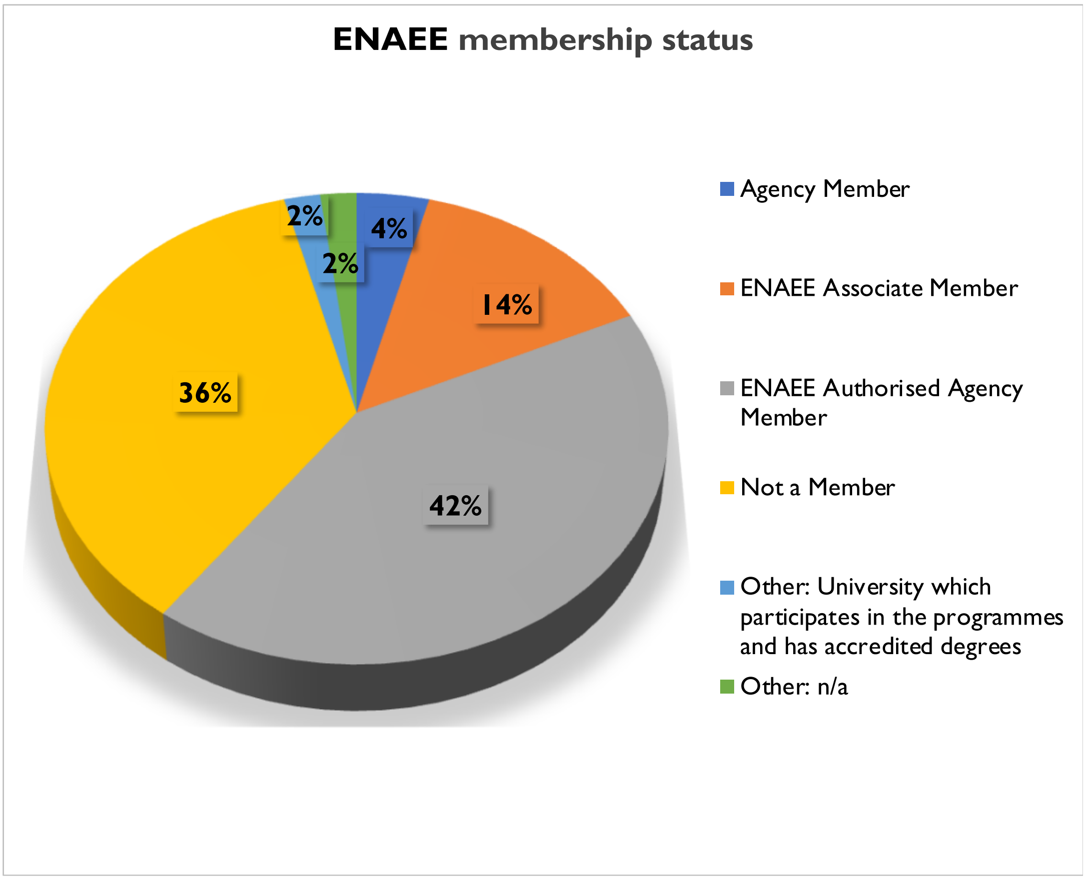
Answered: 50





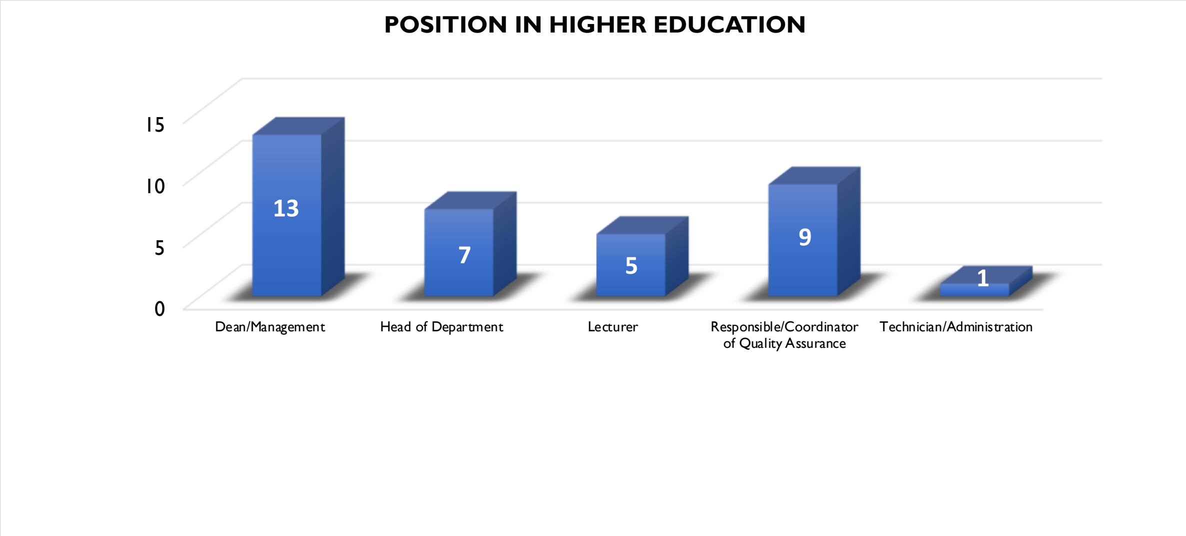
2 ENAEE MEMBERSHIP STATUS

Answered: 50



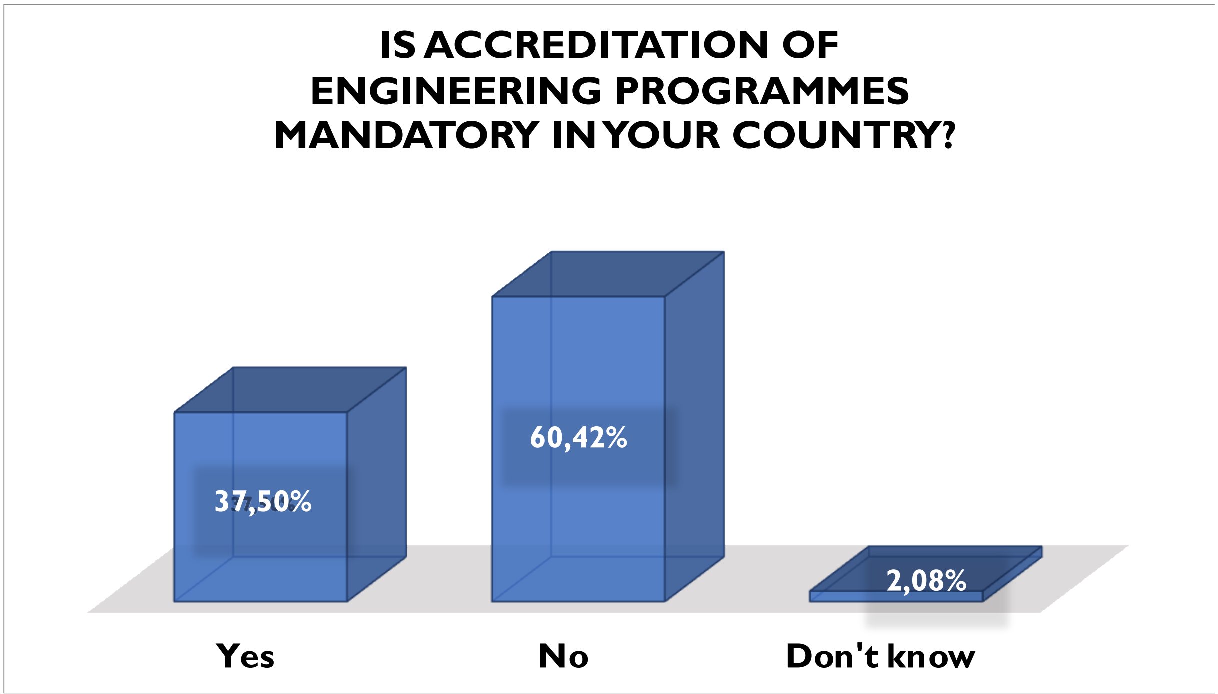
3 POSITION IN HIGHER EDUCATION

Answered: 35



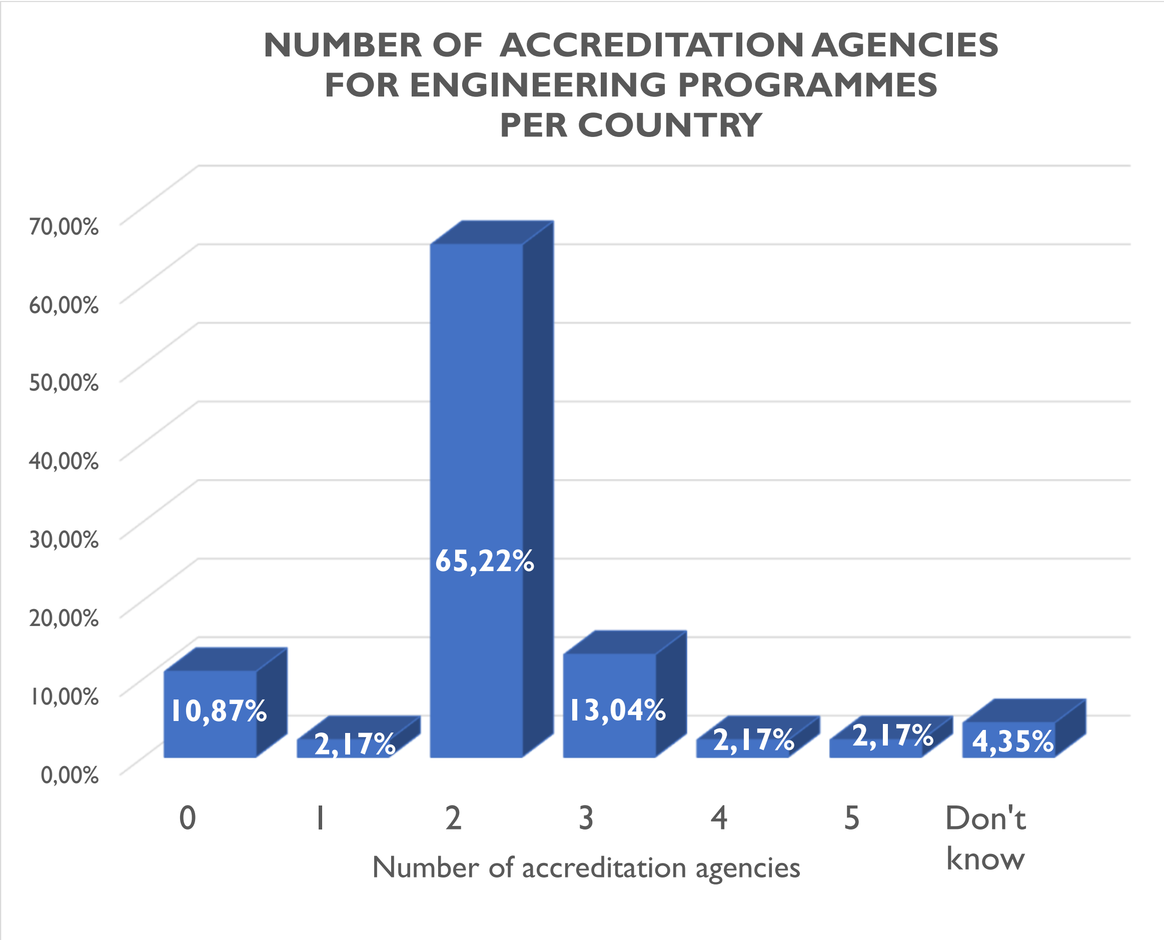
4 MANDATORY ACCREDITATION OF ENGINEERING PROGRAMMES

Answered: 48



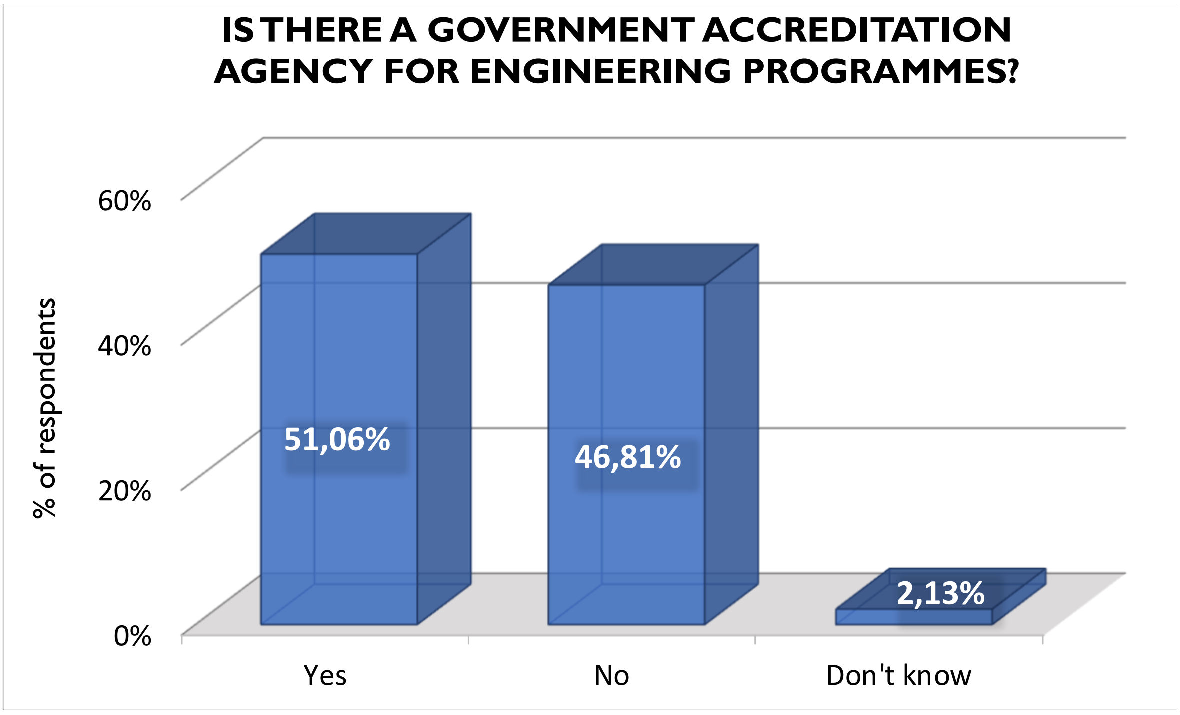
5 NUMBER OF ACCREDITING AGENCIES FOR ENGINEERING PROGRAMMES PER COUNTRY

Answered: 46



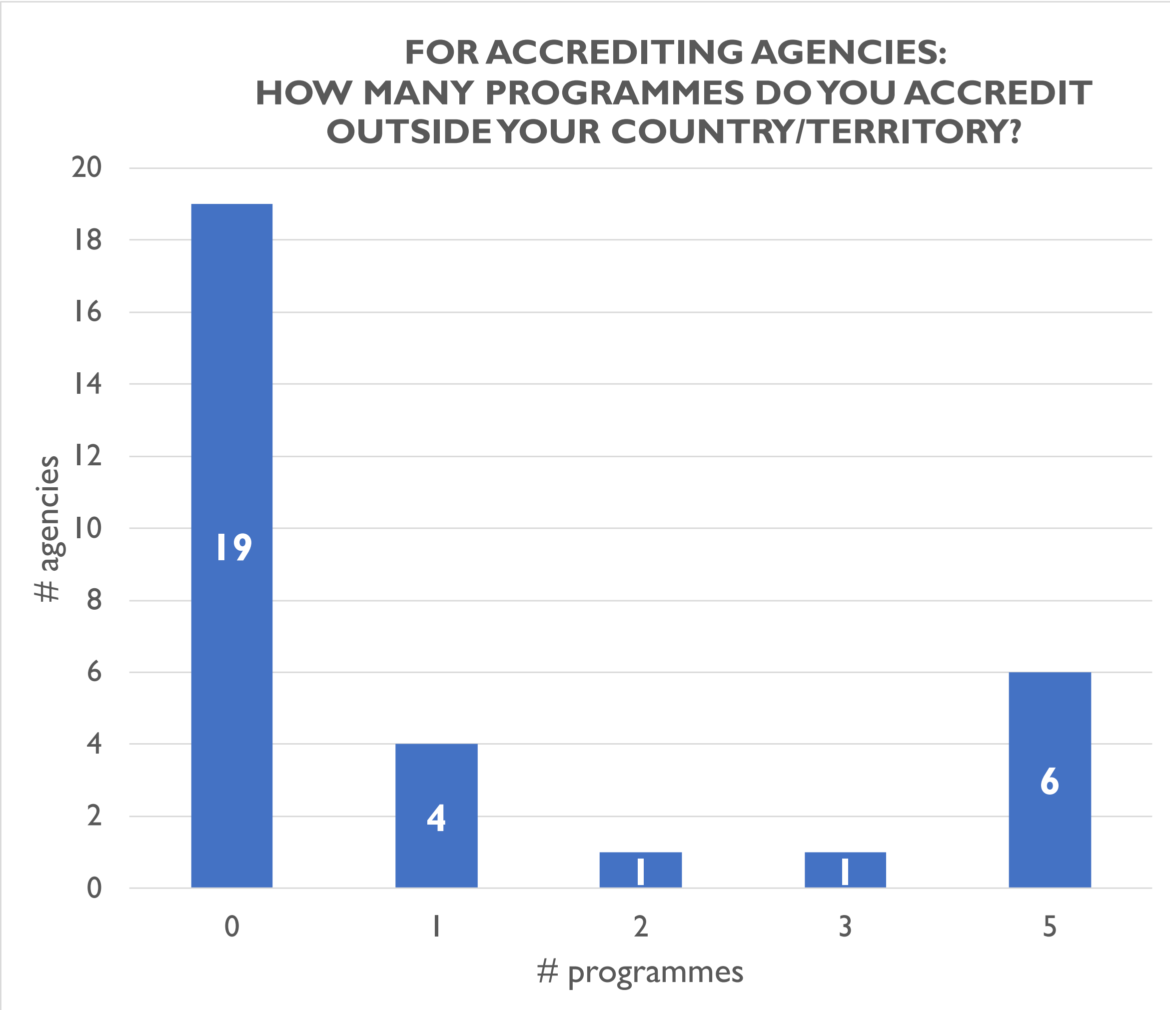
6 GOVERNMENT ACCREDITATION AGENCY FOR ENGINEERING PROGRAMMES

Answered: 47



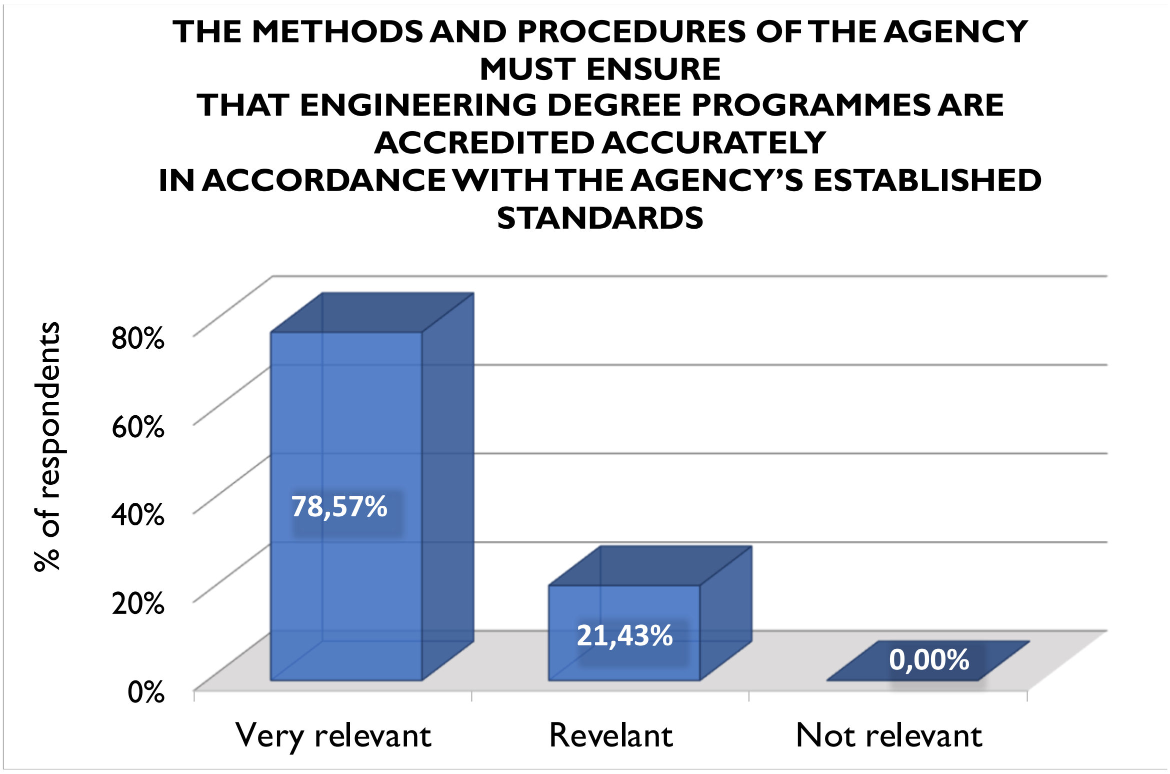
7 ACCREDITING AGENCIES: NUMBER OF PROGRAMMES ACCREDITED OUTSIDE THEIR COUNTRY/TERRITORY

Answered: 31



8 METHODS AND PROCEDURES

Answered: 31

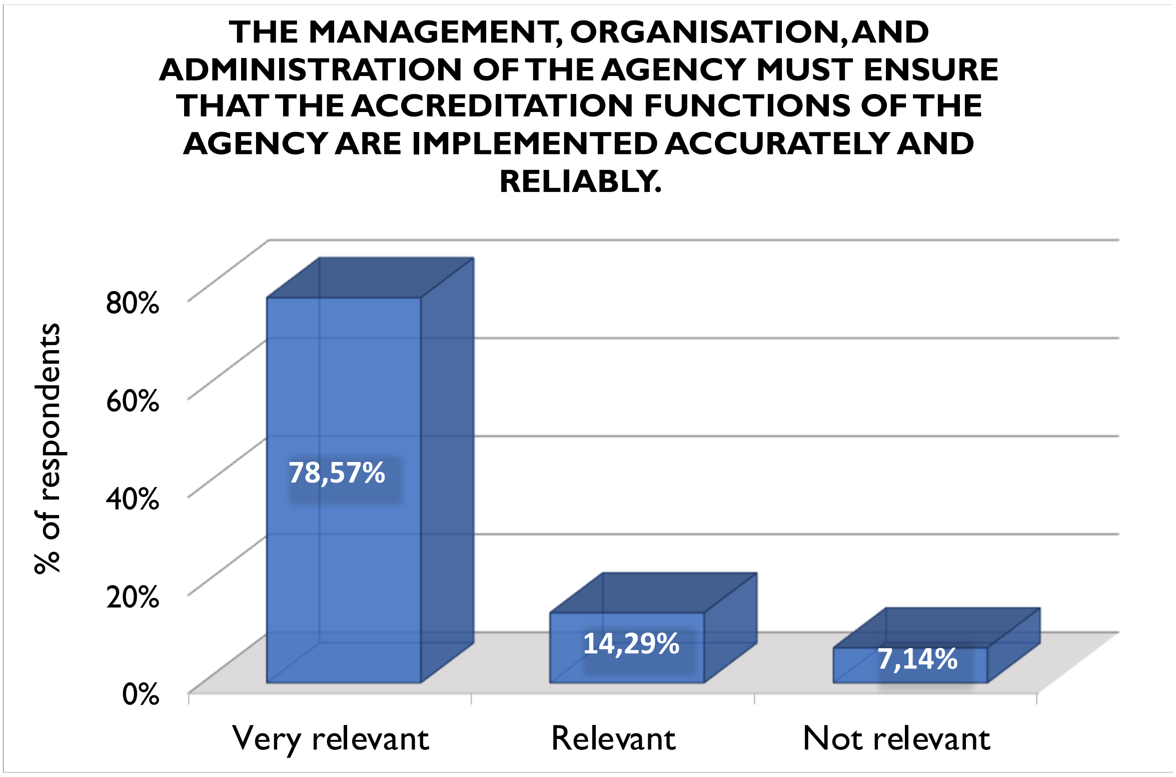


WHAT SHOULD AGENCIES BE ABLE TO DEMONSTRATE?
WOULD YOU LIKE TO DATE SUGGEST ANY CHANGES TO THIS TOPIC?

- I do not understand what is meant with "the relevance of supporting programme areas required to meet"
- Compliance of their methods and procedures to the standards
- Checks and balances on compliance with standards in assessment, reporting en accreditation
- Améliorer l'évaluation de l'atteinte des learning outcome
- Fullfilled of the European Standard and Guidelines, that is why the ENAEE review procedure has to be aligned with the ESG
- Systematic training of the programmes evaluators; check of the uniformity of the programmes

9 ADMINISTRATION

Answered: 14

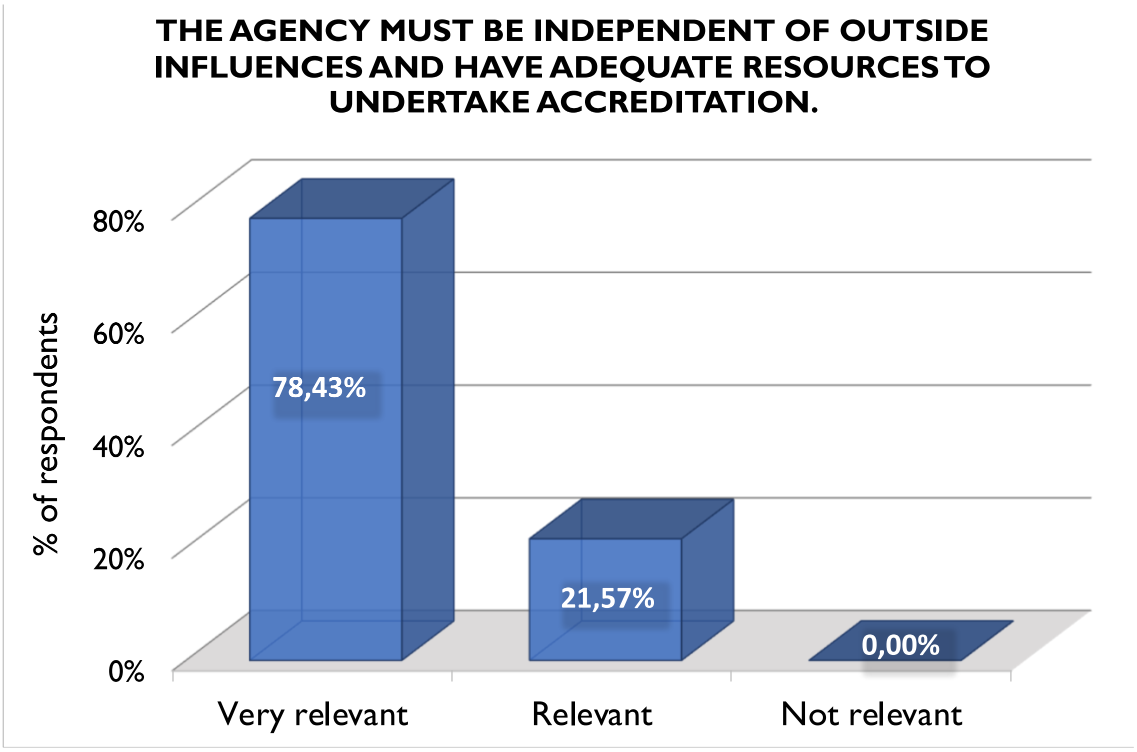


WHAT SHOULD AGENCIES BE ABLE TO DEMONSTRATE? WOULD YOU LIKE TO DATE SUGGEST ANY CHANGES TO THIS TOPIC?

- The agencies must demonstrate that their accredation function is accurate and reliable
- Experience, expertise, professional administration, publication of decisions
- Fullfillment of ESG
- Agencies should collect customer satisfaction questionnaires among the accredited programmes concerning the administration accuracy and reliability

10 STATUS AND RESOURCES

Answered: 14



WHAT SHOULD AGENCIES BE ABLE TO DEMONSTRATE? WOULD YOU LIKE TO DATE SUGGEST ANY CHANGES TO THIS TOPIC?

- - , no
- Their independency in decision making processes.
- You must show that you have a strategic plan and a business continuity plan.
- Independence from institutions and government. Absence of contract relation in funding. Strict separation from Advisory role
- ESG
- Organization should be not for profit

11 NEW AREAS THAT SHOULD BE REQUIRED AS PART OF THE REVIEW OF AUTHORISED ACCREDITATION AGENCIES

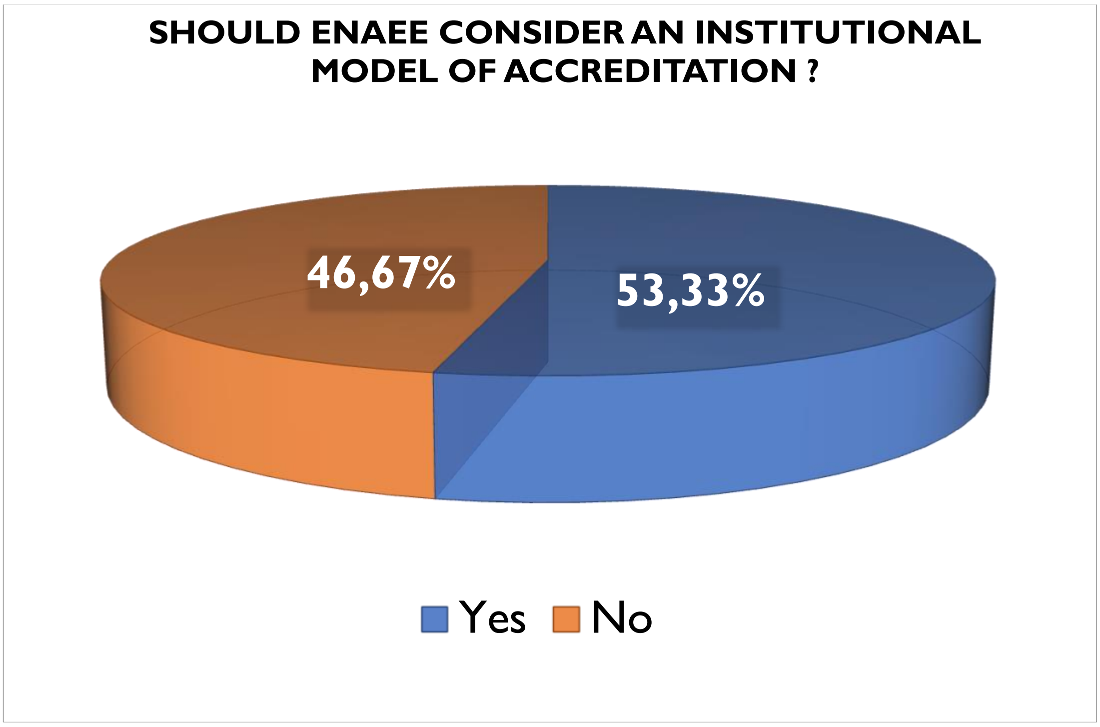
Answered: 5

WOULD YOU LIKE TO PROPOSE ANY NEW AREAS THAT SHOULD BE REQUIRED AS PART OF THE REVIEW OF AUTHORISED ACCREDITATION AGENCIES?

- Agencies should allow for in-house evaluation of engineering programmes by the QA system of the accredited HEI
- strategic plan and a business continuity plan.
- For European agencies the relation to ESG is mandatory.
- Check that agencies carry out expert training. Also check the quality and adequacy of its training courses.
- It has to be streamlined, done differently for the first and subsequent times, use the results of other external reviews, been executed by professionals which are still working in an agency and who participate in reviews on a regular basis

12 ENAEE TO CONSIDER AN INSTITUTIONAL MODEL OF ACCREDITATION

Answered: 15



IF YES, WHAT IN YOUR VIEW ARE THE KEY CONSIDERATIONS?

- Enable the HEI to evaluate their engineering programmes according to EAFSG. Let the authorized agencies verify the compliance of the procedure with the EAFSG.
- If the university conducts activities for the training of engineers and the educational program receives the EUR-ACE Label, then the university itself must meet the ENAEE criteria.
- It is important to be able to have an accreditation model at the institutional level, based on all the experience you have at the professional program level.
- Safeguarding quality in delivering and developing programmes. Maintaining level as defined in international and domain specific qualification frameworks. Quality Culture, Enhancement of quality. Maintaining academic standards and values. Effective Quality cycle.
- The national audit team should host ENAEE experts to ensure that the ENAEE criteria are verified in the courses.
- Make it as manageable as possible and unbeaurocratic as possible to obtain the EUR-ACE seal
- Programme-level accreditation enables assessors to identify programme-specific or discipline-specific concerns.

13 ONLINE ACCREDITATION REVIEW PROCESS: ISSUES

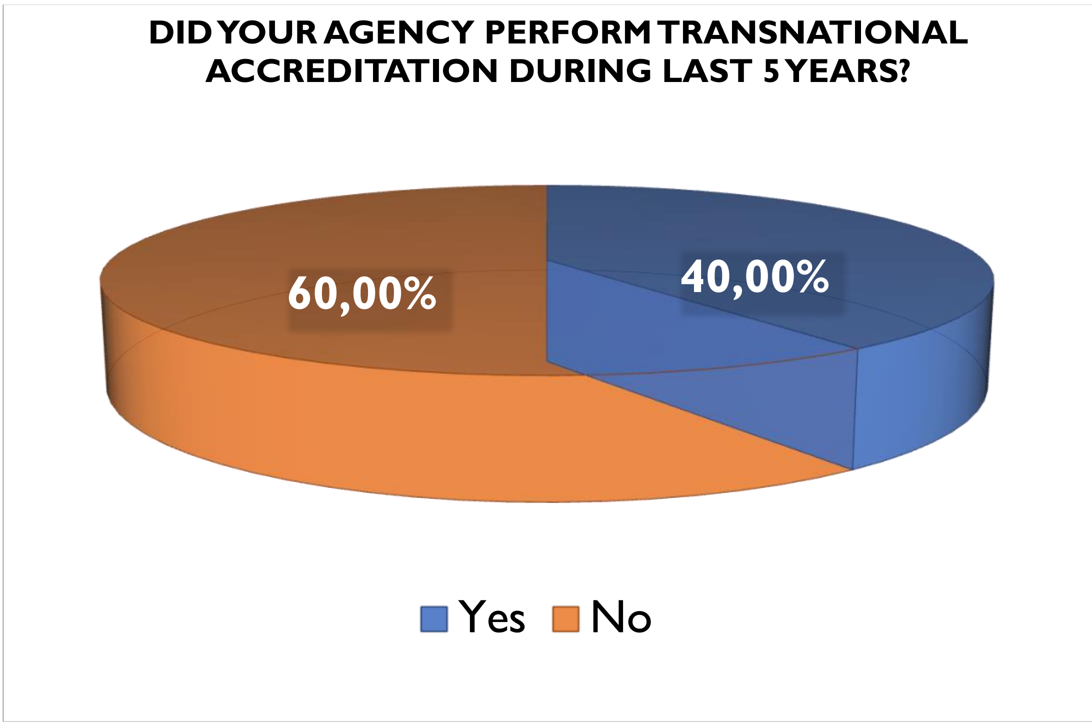
Answered: 12

WHAT ISSUES DO YOU SEE WITH ONLINE ACCREDITATION REVIEW PROCESS?

- Priority to on-site review, online procedure if otherwise not possible
- During online-accreditation, it is not always possible to obtain all the information, to fully assess the material and technical base
- The requirement for digitization of all documents and evaluation of these documents online brings additional time overhead both to HEIs and accreditors. Besides, for first time reviews, on site visits is useful for accurate assesment of the infrastructure, labs, support units etc. However in force majeure cases, online accreditation practices can be conducted with high accuracy and reliability. So, hybrid methods can succesfully be implemented after the pandemic as well.
- None, the evidence must be clear from the evaluated agencies, they should have an ordered virtual repository
- It is completely possible, just include the techonological tools to be able to review the same information as a presential visit
- Only minor issues: be explicit on the open dialog. Have an extra line to exchange observations on quality of the dialog and possible misunderstandings. Keep documents structured and organized. Better preparations, structure 'heurisic' by panel.
- Lack of experts specially trained for such accreditations
- Online accreditation should be favoured in times of crisis.
- Virtual rooms containing all of the documents and evidence help the review process. Problems related to the review of laboratories etc should be considered.
- Has to be prepared more carefully with more time, ASIIN has passed an internal policy on this
- Online accreditations have been very important during the COVID-19 pandemic, however, they exclude the networking/social aspect which many assessors cherish. Also, the informal conversations with the programme team can be very fruitful for accreditation. Finally, site visits are useful and rewarding. In future, a blended model is preferable, e.g. online evidence/meeting complemented by a shorter site visit and meetings.
- Pay attention to the possibility to check the real infrastructures; be sure to discuss with real students of the programme to be assessed

14 TRANSNATIONAL ACCREDITATION

Answered: 15



IF YES, HOW MANY?

- 1
- 2
- 75
- 14

15 STANDARDS AND PROCEDURES ON TRANSNATIONAL ACCREDITATION FOR ENAEE AUTHORIZED AGENCIES

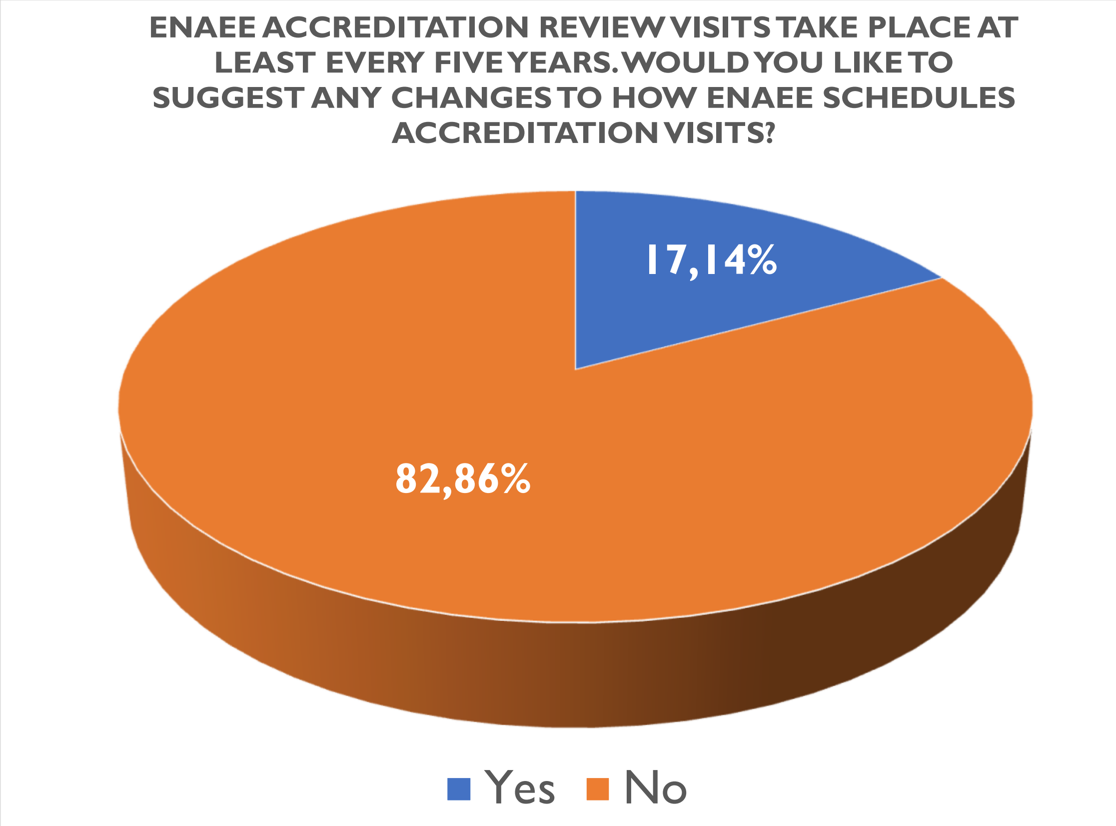
Answered: 7

PLEASE PROVIDE ANY COMMENTS YOU MAY HAVE ON STANDARDS AND PROCEDURES ON TRANSNATIONAL ACCREDITATION FOR ENAEE AUTHORIZED AGENCIES

- Compliance of accreditation agency standards with state standards of a particular country
- Transnational accreditation should be done only if there is no accreditation agency in the country the program belongs. If there is a local agency, transnational accreditation should not replace the local accreditation
- Agencies should communicate with local agencies. The accrediting agency should inform ENAEE of the audit in advance.
- They are very well documents. All of the agencies should obey strictly follow rules.
- It is in many aspects detrimental to the idea of providing free services within the European Higher Education MArket and it does not take stock of the existing policies in many member countries of ENAEE
- Engineers Ireland is currently exploring accreditation visits to Northern Ireland (NI). Many engineers who qualify in NI practice on a cross-border basis or move south to live and practice. In the midst of Brexit, the Irish government and EU have taken steps to promote cross-border collaboration and trade. Furthermore, UK-based accrediting bodies have accredited in Ireland for many years.
- Transnational Accreditation should:
  a) be an opportunity to share best practices applied in other countries;
  b) not be a way of circumventing national rules;
  c) not be a way to achieve accreditation more easily

16 VISIT SCHEDULING

Answered: 35

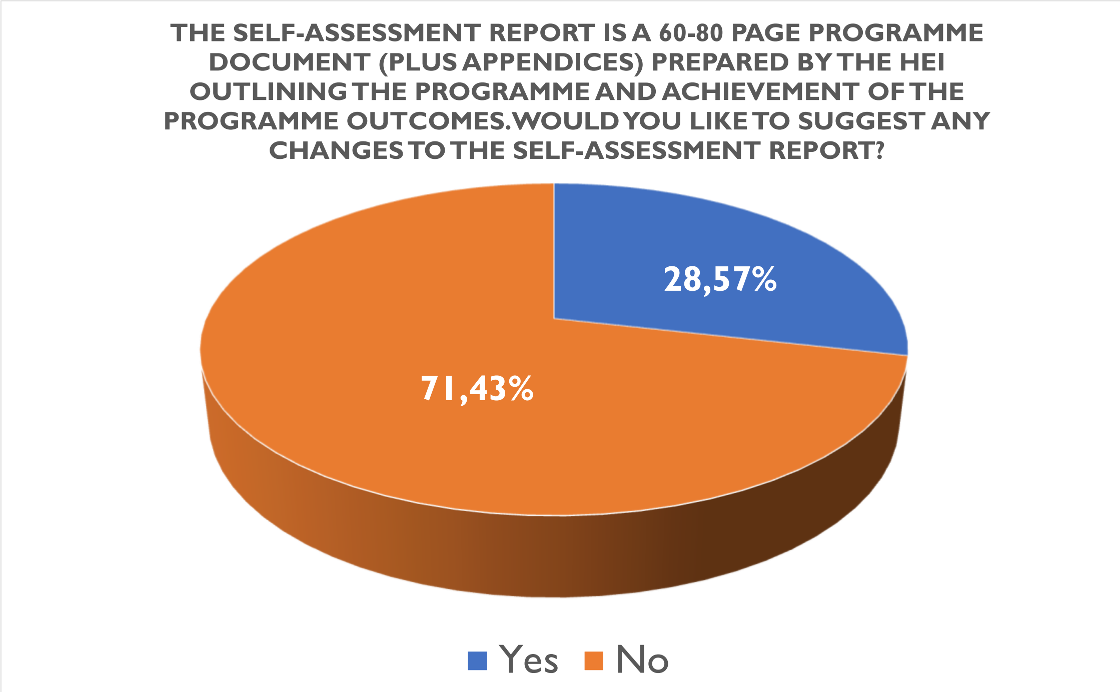


SUGGESTIONS

- Visit every seven years
- Six year, which is the National schedule of accreditation. Several complications occur as result of asynchronous schedule (see also AACSB)
- Each 7 years as for our Institutional accreditation
- The reevaluation period could be larger or progressive. Also in this scenario, the follow-up of indicators from major recommendations of the evaluation committee could be scheduled for a shorter/mid term, but only led to a shorter accreditation period if the HEI fails to comply with the goals within the given period.
- Many changes, as mentioned before. Difference between first and reaccreditaiton, alignment with ESG, taking stock of other external reviews, experts which are still in the business, better training of the experts

17 SELF-ASSESSMENT REPORT

Answered: 35



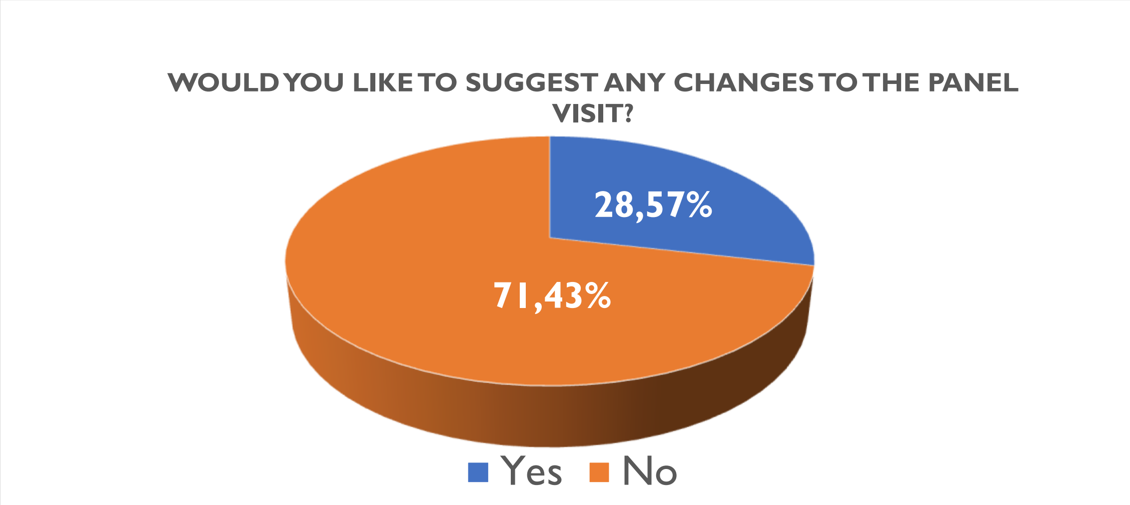
SUGGESTIONS OF CHANGES TO THE PANEL VISIT

- The model of the report is useful. It should not be compulsory, though. The QA system of the accredited HEI should determine the form of the SAR, supervised by the authorized agency
- I suggest that as much as possible the material is digital.
- We should minimize the bureaucratic burden. reduce number of pages and use existing documentation.
- Scope for greater conciseness in reporting.
- 40 pages without appendices is enough from our point of view.
- Increasing the focus on the acquisition of skills.
- Show how the programs support/encourage/recognize the commitment of the Professors to their continuous development as educators. Do the program educators have independent recognition of their professional development (preferable international)?
- Our self-assessment reports have been considerably and consistently much larger than 80 pages. Some clear pointers of what is required in each section/field together with a recommended text length should be offered in the templates. The auto-evaluation report could be shortened/simplified for re-evaluations, at least if no major changes were made to the programme. The self-assessment report could be made available online to uniform the requirements between HEIs, but care must be taken not to overburden the HEIs with extra requirements and bureaucracy. The report should at least be dematerialized, i.e. not forcibly printed.
- Some parts could be submitted online or an online template could be used.
- The report could be somewhat shorter, say 40-60 pages, focusing on more general overview, not as shallow as ABET on the other hand.

18 **PANEL VISIT**

Answered: 35

ENAEE REVIEW VISITS TAKE PLACE OVER TWO DAYS IN THE COLLEGE AND INCLUDE MEETINGS WITH PROGRAMME STAFF, REVIEWING PRE-PREPARED EVIDENCE, INTERVIEWS (STUDENTS, GRADUATES, EMPLOYERS), TOUR OF FACILITIES, AND PRESENTATION OF INITIAL FINDINGS.

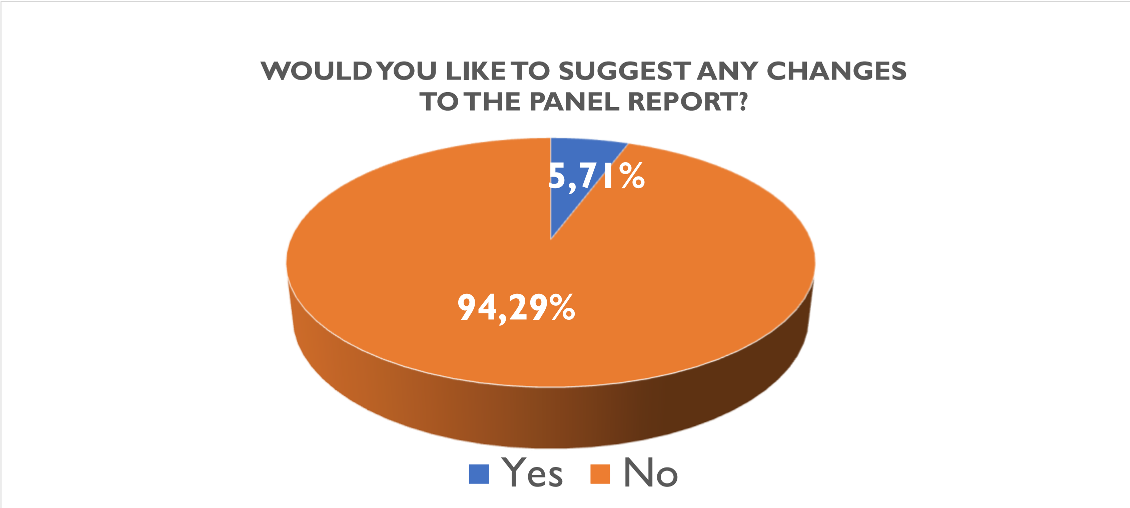


SUGGESTIONS

- Increase more days, if the program is offered in more cities or campuses.
- Three days is what we use, currently because of the pandemia and virtual visits we can use an additional day
- Mix of online and on-site visits.
- Clear instructions for the personnel who are invited as interviewees of support service staff
- If one programme applies for a bachelor and masters accreditation in the same area at the same time the visit could be organized to take place during the same period. Site visits are usually very extensive and exhaustive, if deemed adequate, common facilities (classrooms/study rooms; library; support services; ...) could be evaluated once within a given period and their adequacy attested by the accreditation agency for the next few visits/programmes.
- Each agency has its own procedures and criteria which need to be in line with the ESG and EUR-ACE LO approach
- Reviewing online evidence and preliminary online meetings of the panel could be used to shorted the panel site visit to one day.
- The review of evidence could be put online and reviewed prior to attendance at the HEI, thus shortening the visit durations to approx. one day

19 PANEL REPORT

Answered: 35



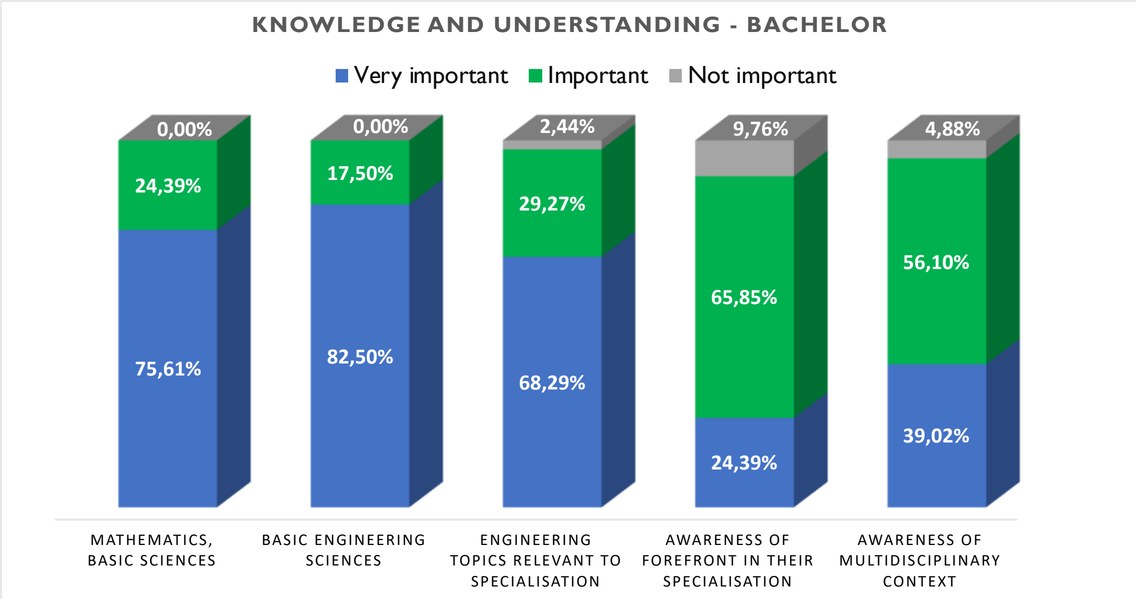
SUGGESTIONS

- Leave programme information out, refer to existing web-pages or documents.
- The report itself is very comprehensive. Nonetheless, a better template and/or formatting could be put in place to improve the separation between the evidences gathered and the comments and recommendations from the evaluation committee, especially in the first part of the report. It could be provided in an electronic format to be easily distributed and better indexed/searched by the stakeholders.
- If you mean the agency review report, then yes, because they are by no means comparable, those who write the reports need to be trained and have to have experience to conduct accreditations on a regular basis, which is frequently not the case

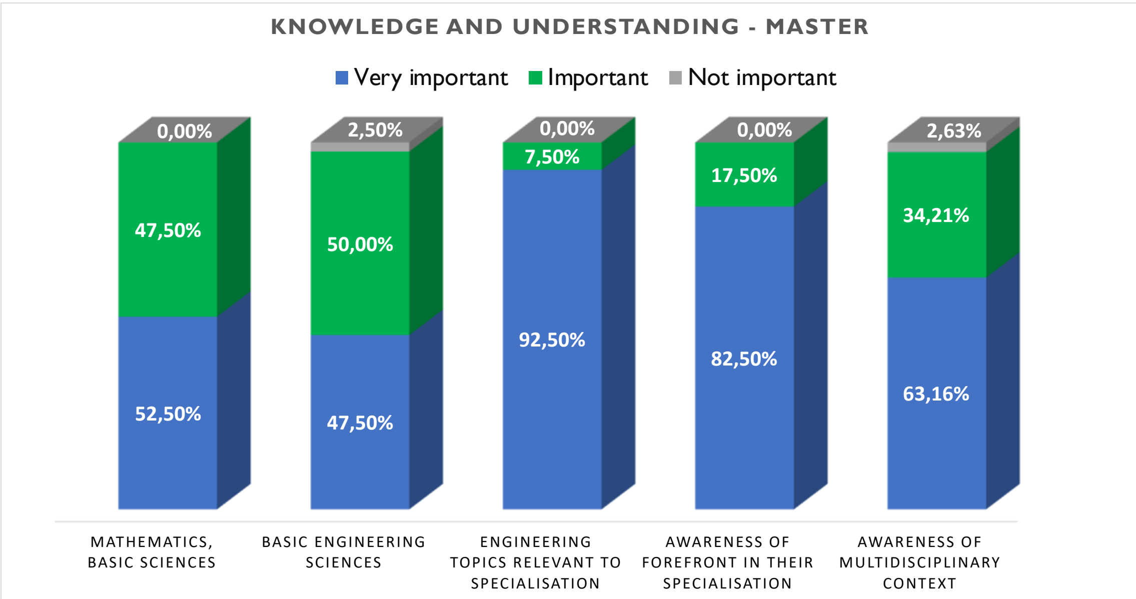
ENGINEERING EDUCATION PROGRAMME AREAS IN EAFSG

20 & 21 KNOWLEDGE AND UNDERSTANDING

Answered: 41

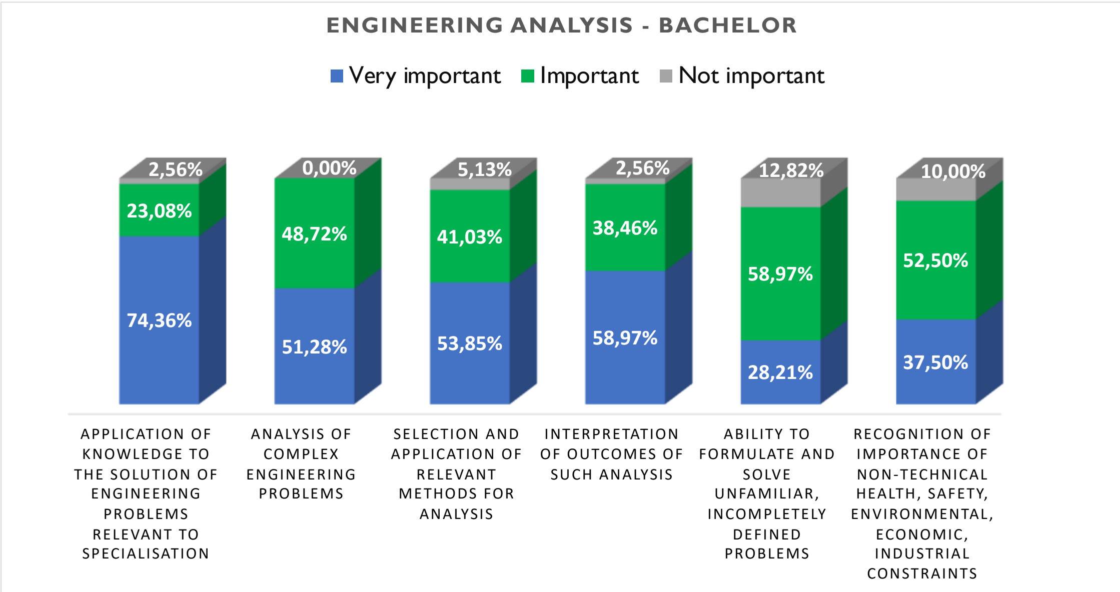


Answered: 40



22 & 23 ENGINEERING ANALYSIS

Answered:40



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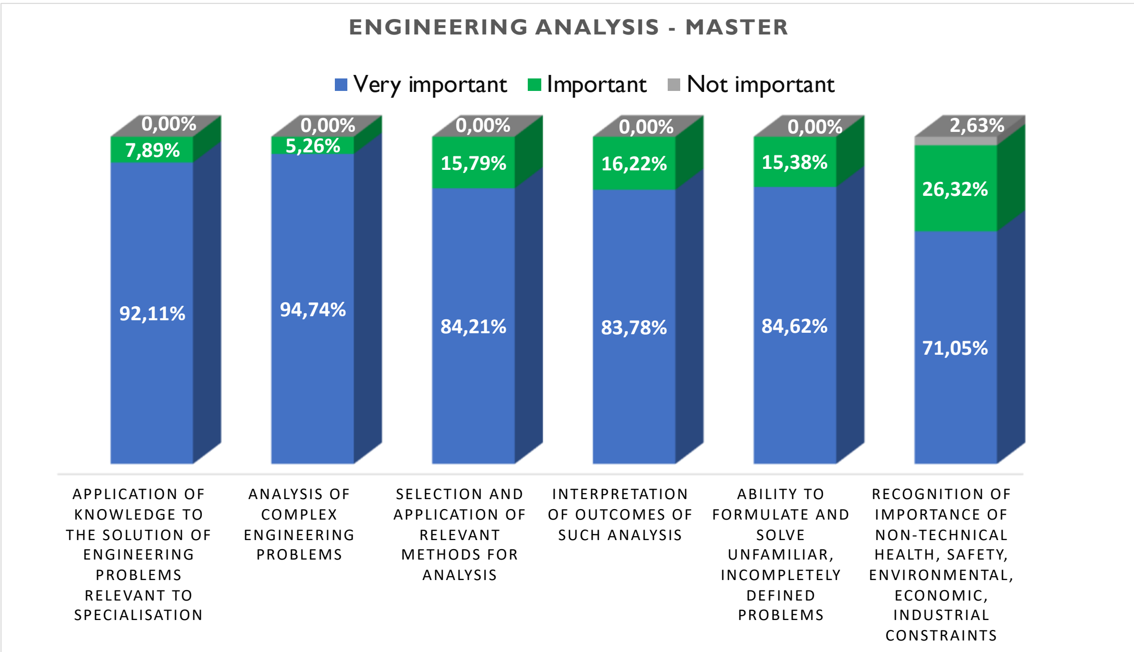
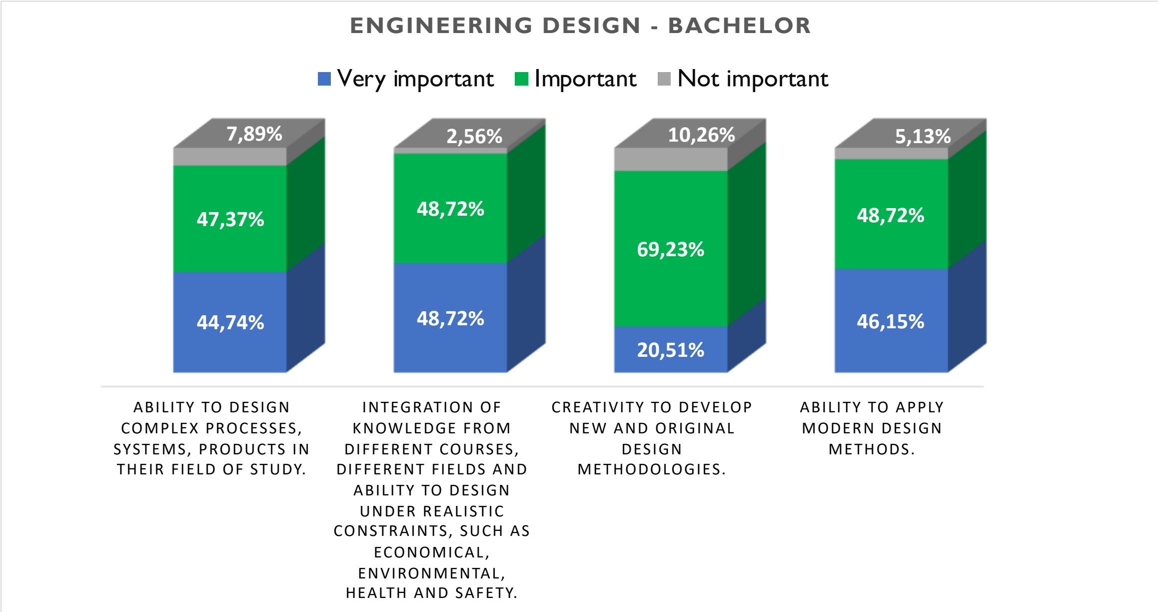


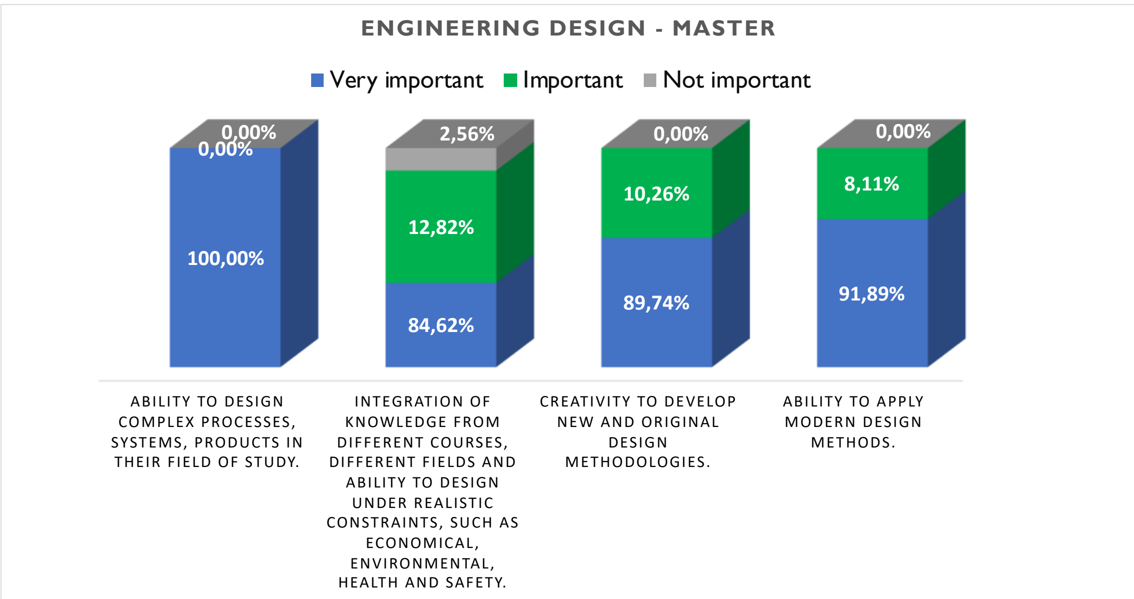
ENGINEERING EDUCATION PROGRAMME AREAS IN EAFSG

24 & 25 ENGINEERING DESIGN

Answered:39

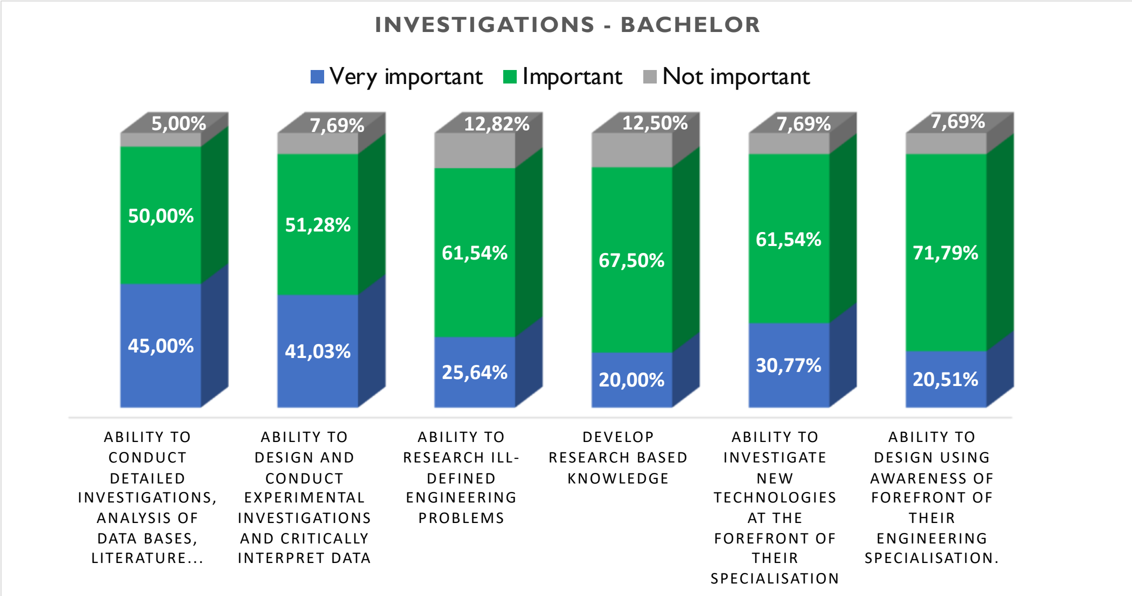


Answered:39

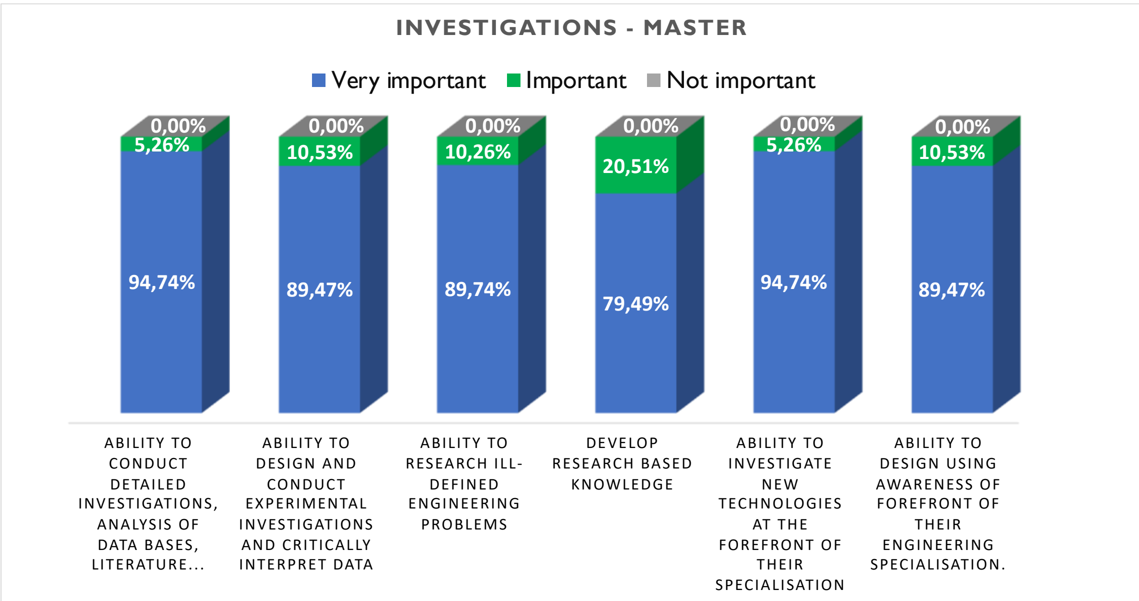


26 & 27 INVESTIGATIONS

Answered:40



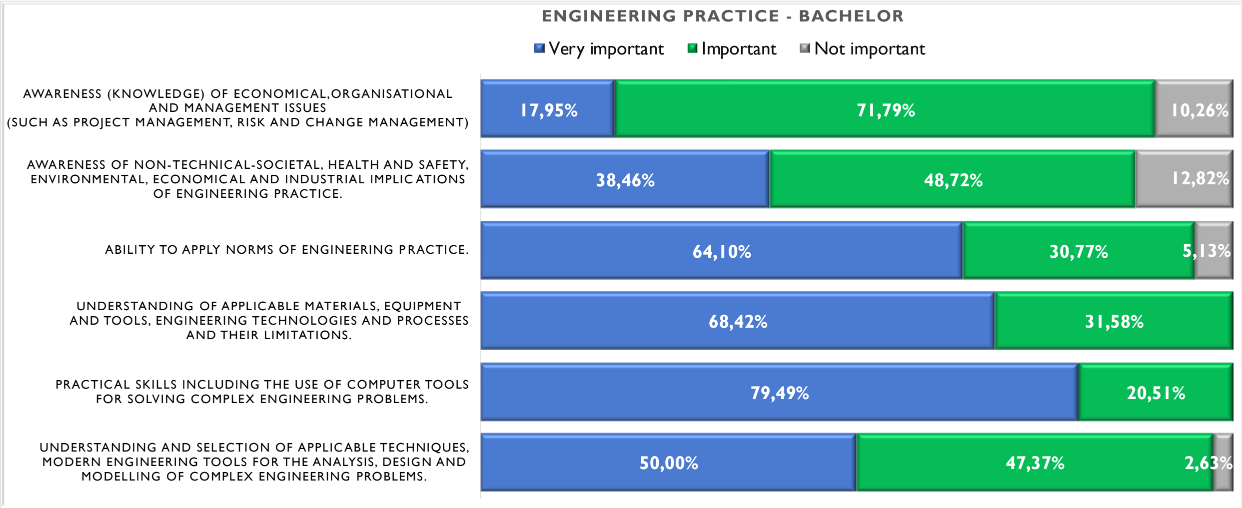
Answered:39



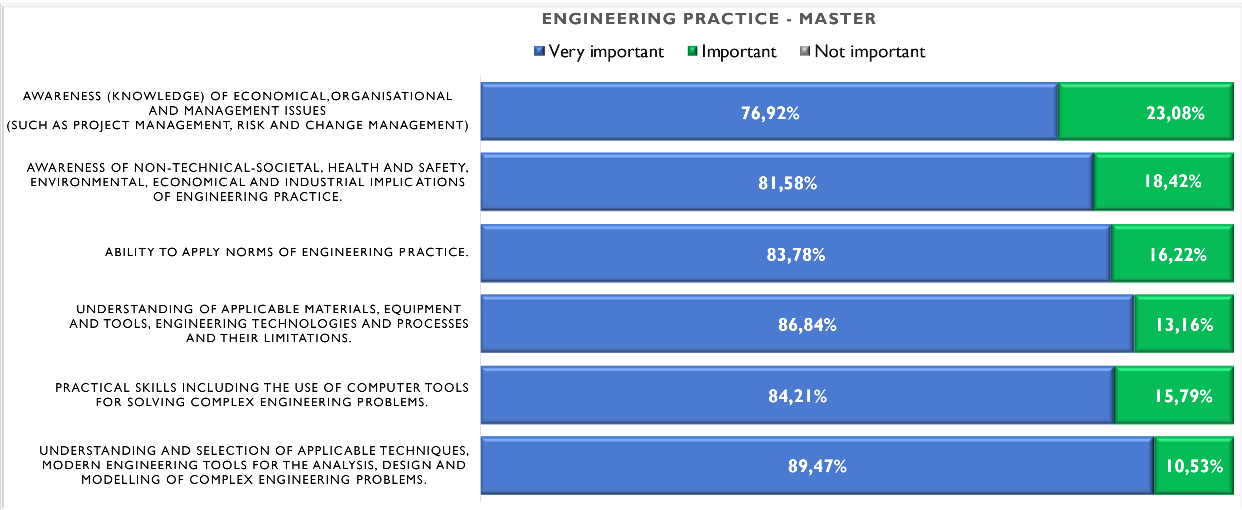
ENGINEERING EDUCATION PROGRAMME AREAS IN EAFSG

28 & 29 ENGINEERING PRACTICE

Answered:40



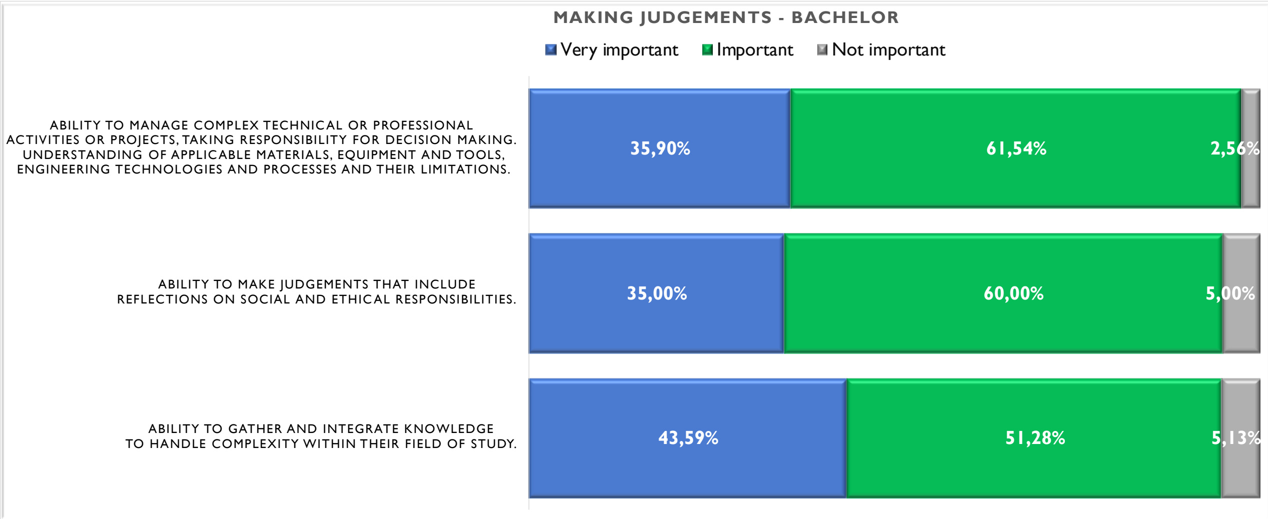
Answered: 39



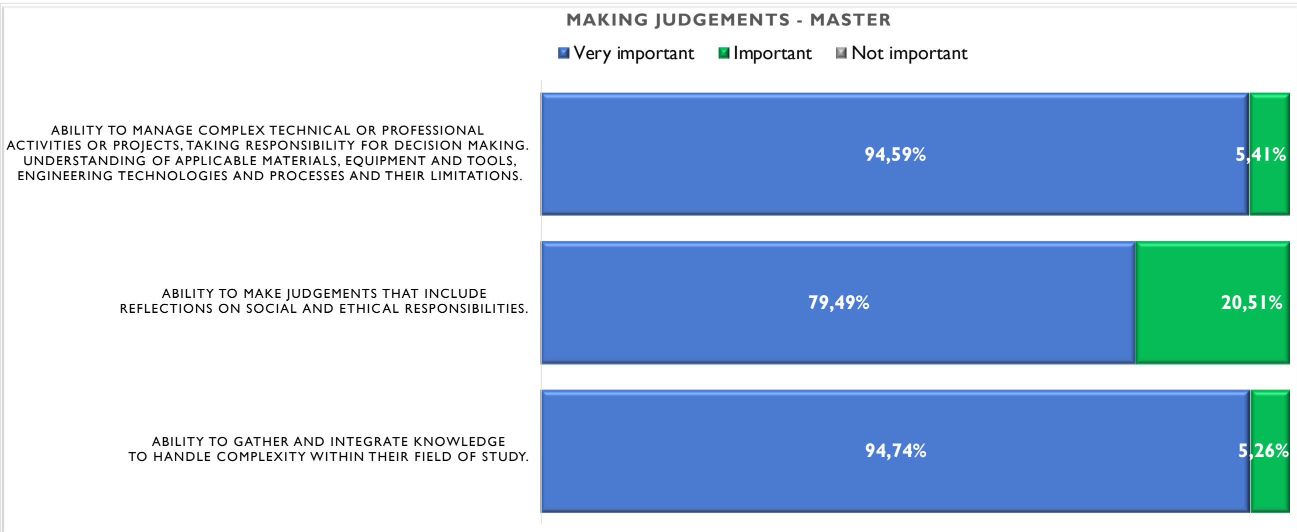
ENGINEERING EDUCATION PROGRAMME AREAS IN EAFSG

30 & 31 MAKING JUDGEMENTS

Answered:40

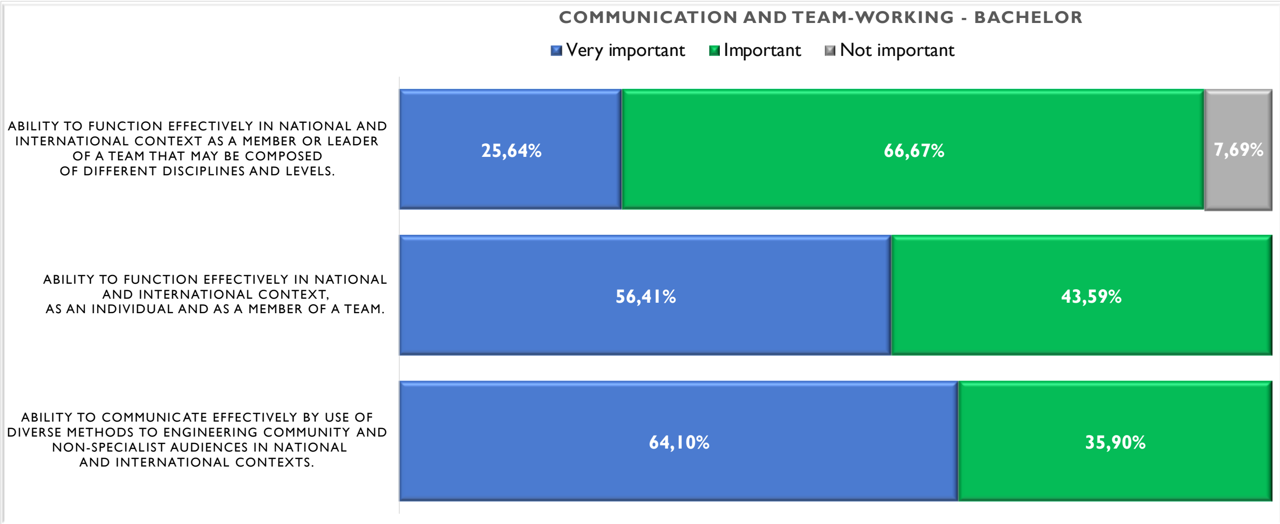


Answered: 39

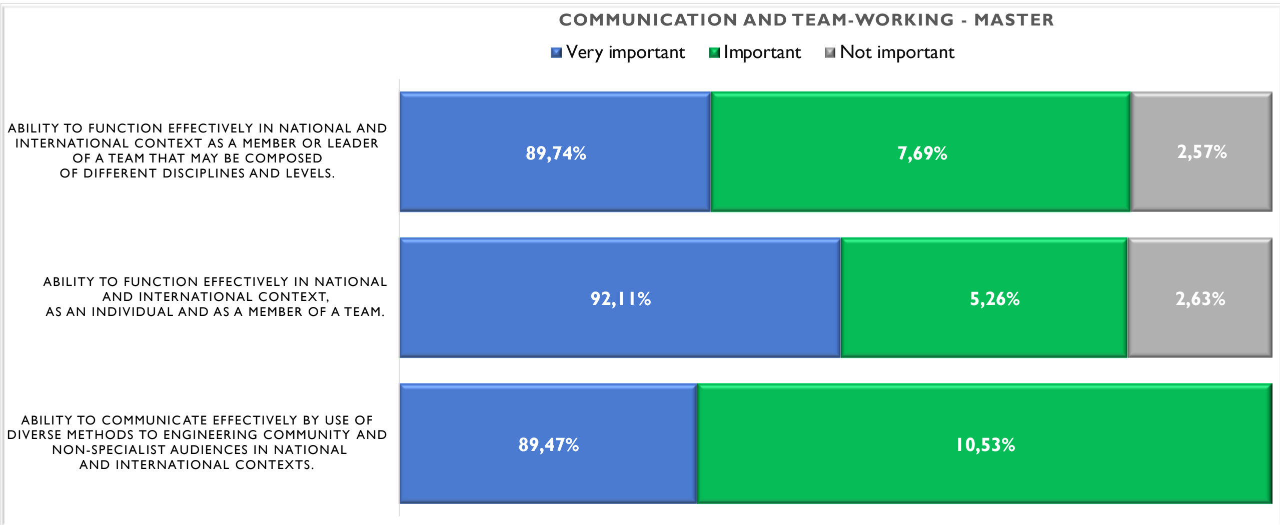


32 & 33 COMMUNICATION AND TEAM-WORKING

Answered: 39

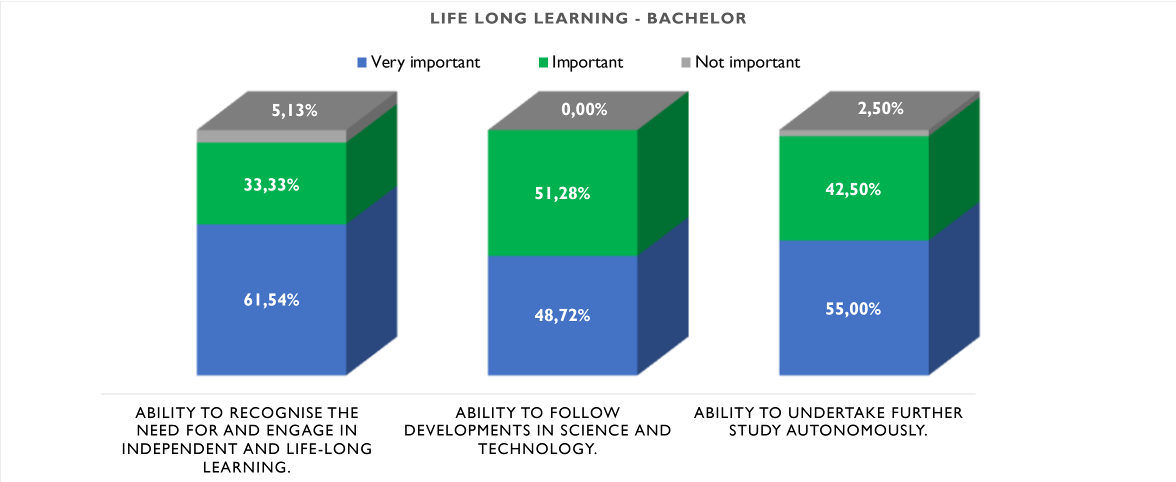


Answered: 39

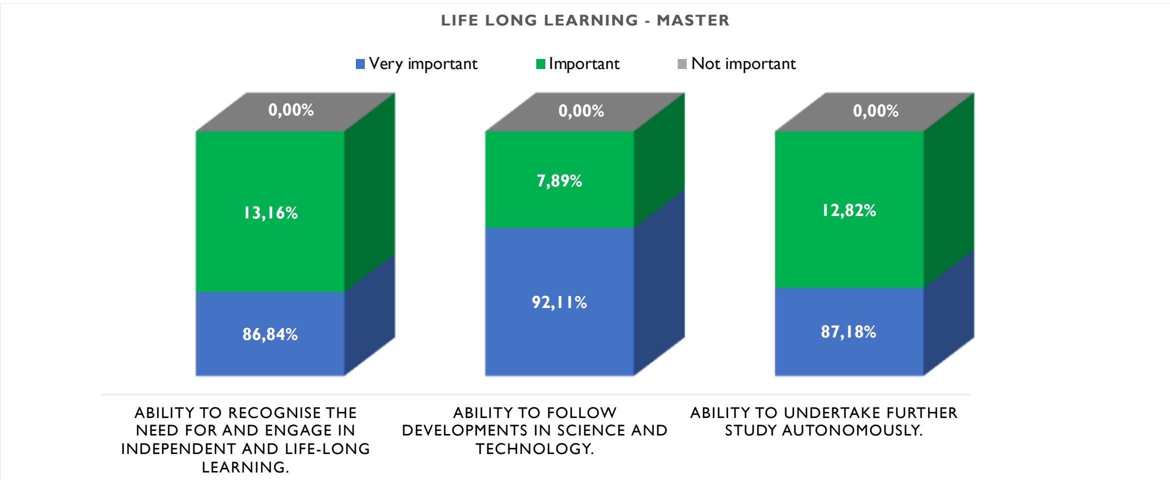


34 & 35 LIFE LONG LEARNING

Answered: 40



Answered: 39



36 DEFINITION OF "COMPLEXITY" IN THE ENAEE GLOSSARY

Answered: 29

WITH REFERENCE TO THE DEFINITION OF "COMPLEXITY" IN THE ENAEE GLOSSARY: "THE PROPERTY OF BEING COMPLEX; THAT IS HAVING A NUMBER OF INTERCONNECTED PARTS. USE ENGINEERING JUDGEMENT TO WORK WITH COMPLEXITY' MEANS THAT THE ISSUE UNDER CONSIDERATION IS NOT STRAIGHTFORWARD OR AMENABLE TO ANALYSIS OR CALCULATION USING STANDARD METHODS, BUT REQUIRES JUDGEMENT TO BALANCE POSSIBLY CONFLICTING
REQUIREMENTS."
IN YOUR VIEW WHAT IS THE DIFFERENCE IN UNDERSTANDING OF "COMPLEXITY" BETWEEN ENGINEERING BACHELOR AND MASTER?

- Consider national (or European) qualification framework. Bachelor: use engineering judgement in well defined context Master: use engineering judgement in incompletely defined context
- Complexity for bachelor: How to mobilize knowledge for solving a problem Complexity for Master : How to solve multiparty problems
- Main difference is dealt with depth of considering an engineering object, methods and tools from the system analysis point of view.
- The bachelor must find already existing methods to solve the issue in question. The master must create his own methodology for solving the issue in question
- Complex problems have no obvious solution and may involve wide-ranging or conflicting technical issues and/or user needs that can be addressed through creativity and the resourceful application of engineering science. Broadly-defined problems involve a variety of factors that may involve conflicting constraints, but may be solved by the application of engineering science and proven analysis techniques.
- The notion of "complexity" takes time to be understood in its whole dimension, so we can consider that Bachelor is an awareness period for initiating the learner and improving continously his/her approach to complexity and Master the time when the engineering judgement can be put in place taking into account all interconnected parts
- There are different levels of complexity. Already in the bachelor systems with interconnected parts are studied, with conflicting requirements. In the Master, more initiative is asked from the students, the systems become larger, the diversity in the inerconnected parts is larger, etc.
- In Ireland we would consider complexity roughly as you define it above ("... the issue under consideration is not straightforward or amenable to analysis or calculation using standard methods, but requires judgement to balance possibly conflicting requirements"). We use this idea of complexity as one of the primary differentiators between Bachelors and Masters in the areas of (i) knowledge and understanding of the mathematics, sciences, data science, analytics, and other technologies underpinning the branch of engineering, where for the Masters there is an expectation that these will be at a more advanced level, (ii) the ability to identify, formulate and analyse engineering problems, and (iii) the ability to design solutions to engineering problems, where in both cases, for the Masters the expectation is towards significantly more complexity than for the Bachelors.
- Leadership competency and the ability to perceive complex problems and apply the scientific knowledge to them is required at Master level.
- At bachelor level, expecting the students to develop skills of a complex system as per above definition is not realistic. A system with multiple interacting components with multiple design criteria is complex enough for bachelors. Judgement in possibly conflicting requirements requires further specialization and experience, and is more appropriate for masters level.
- Bachelor should solve current problems, master should anticipate problems before they happen and create solutions to avoid such problems

36 DEFINITION OF "COMPLEXITY" IN THE ENAEE GLOSSARY (cont'd)

- Complexity at Master level may require more investigation, including some experimental analysis, in order to fully understand the "complexity".
- Master level considers the topics more "research based".
- Bachelor: more emphasis on analysis; an Engineering calculation would result in a limited set of solutions, relevant to a particular subsystem; applied technologies are more settled and mature. Master: greater scope and breadth of the problem; Engineering calculations are more uncertain and subject to the context's variability, takes into account more factors; applied technologies are more innovative and cutting edge.
- There is no difference
- For the Bachelor, the important elements of complexity are in the environment. they are a few. This is not the case for the Master's degree, which must take into account broader factors.
- Complexity definition may be kept the same. However, more emphasis may be given to the master programs.
- In simple terms, a bachelor graduate should grasp the complexity of a unit operation and its relation with neighbouring units while the master graduate should be capable of envision, design and manage large arrays of unit operations or, in other words, systems encompassing other systems and their respective setting or context.
- The degree of the complexity; for bachelor - less complex for master - the complexity increases
- The skills of a bachelor, to solve acts of great complexity, without a long professional experience are much inferior to those of a mast
- The IEA graduate attributes consider the range of complexity in the context of engineering problems and activities (complex v broadly defined), and the knowledge profile required, e.g. problems that "have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models" v problems that "can be solved by application of well-proven analysis techniques". The tabular layout in the IEA GAPC is makes it easy to understand the difference between the various accords.
- There is no difficulty
- All engineers should have the ability to deal with complex problems. However, the definition of complex problems is poor. It suggests that a complex problem is one that contains interconnected parts and cannot be dealt with by standard analysis. This definition could be applied at all scales; i.e. it could refer to a component or a complete structure. Further, it does not address the fact there may be more than one solution and any one solution may not satisfy all criteria. An alternative is to describe a complex problem is one which can have more than one solution, and can only be solved by breaking it down into parts that can be solved using standard methods. Hence, an engineer has to have the ability to identify the problem from different perspectives, be able to separate out the components of the problem, understand the interrelationships and interdependencies between those components, and be able to identify the methods by which the components can be analysed including the limitations of the analysis. The difference between the bachelors and masters level lies in the context of the problem and stakeholder engagement. An engineer with a bachelor degree must be aware of the context of the problem but not necessarily be able to relate to non-engineering stakeholders. A master's graduate must be able to define the problem in consultation with other stakeholders and produce a solution that is consistent where possible with all stakeholders. Engineers must be aware of the environmental issues that have to be addressed. A master's graduate should be able to take a holistic view of the problem and possible solutions whereas a bachelor's graduate should be aware of the need to take a holistic view.
- The difference is more in the ability to manage "complexity" between bachelor and master graduates
- An engineering bachelor student must be able to see the limit of her/his scope of complexity
- and to identify a reference (hierarchy, colleagues) to help solve ther problem, whereas as an engineering master student needs to deals with (to solve) the complex problems.
- I don't see the need for such difference
- Bachelor - managing complexity of design within a team Masters - leading the complex design as team leader
- BS: Complexity is in higher level of the system MS: Complexity is in lower level of the system Example: Optimization of the circuit board (BS) vs optimization of the chip design (MS)
- Deep and speed

37 COMMENTS & SUGGESTIONS

- Programm managers are making use of these areas when revising their programmes. The importance of some attributes cited above is context sensitive. That is why I stopped ticking the importance level. What do you ask for under 30c?
- Ability to develop modern engineering tools must not be expected from all bachelors students, a skill at usage level should be enough. The stress on 'complexity' of engineering problems in the expected program outcomes should be softened. Ability to give instructions is hard to measure in bs level; and is usually superficially evaluated. The discipline specific criteria should be updated, as some of these are rather outdated.
- Guidelines for the accreditation procedures and self-study should be clearer, especially when accrediting Bachelor and Master in the same field. We sometimes find serious difficulties interpreting the guidelines and definitions. Examples would be very useful to prepare the Sef- study and assess our programmes.
- There are a lof of attributes and some can be joined in unique attribute.
- The self-assessment report template (S8 / S12) could provide/suggest an evaluation matrix and a recommend rating scale (0-100, 0-10, ...) for each outcome.
- Alignment should be encouraged between ENAEE and the International Engineering Alliance accords with regards to definitions, standards, guidelines, procedures etc.
- Given the poor definition of a complex problem and the lack of understanding of what constitutes a complex problem, it would be entirely appropriate to set up a working group to give clarity to the description.
- I am all for accreditation of the programs to ensure certain quality. On the other hand, a rigid structure may hinder flexible which should exist ın a "university". Some level of flexibilities are necessary to try methods and ideas in education even though most of the time it may or may not fail. Even a small ratio of successful ideas can improve the quality of the education in the long run.

38

ADDITIONAL AREAS TO BE ASSESSED FOR ENGINEERING PROGRAMMES

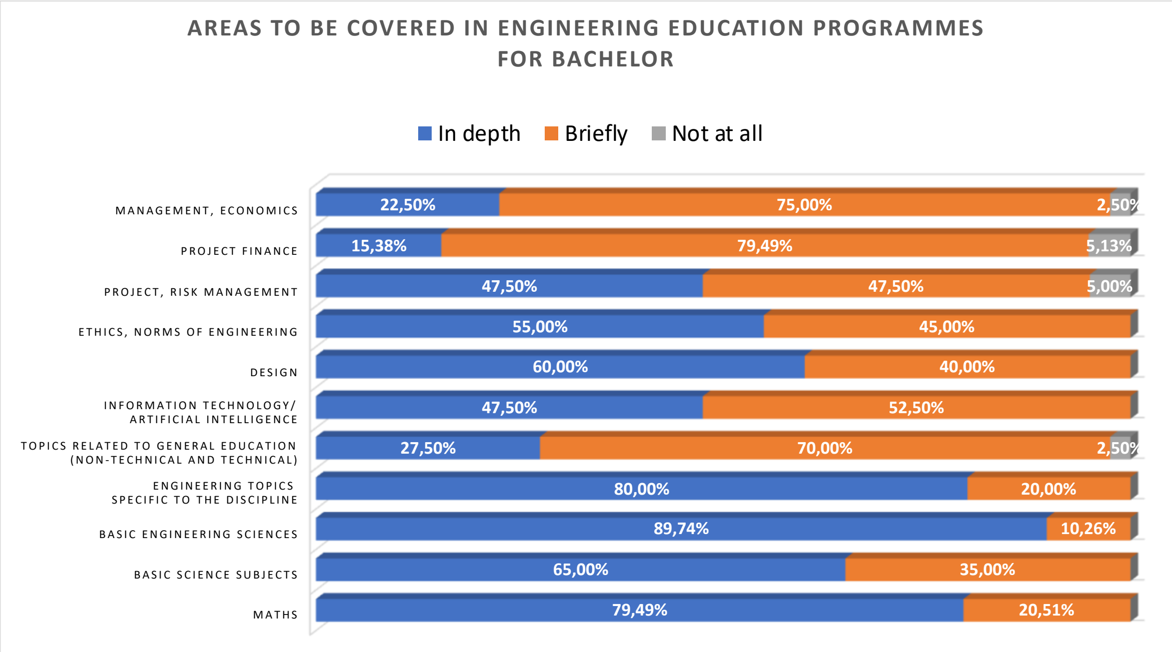
CAN YOU SUGGEST ANY ADDITIONAL AREAS THAT SHOULD BE ASSESSED FOR ENGINEERING PROGRAMMES? FOR EXAMPLE: ONLINE ENGINEERING PROGRAMMES, COOPERATION WITH THE SOCIO-ECONOMIC ENVIRONMENT (LABOUR MARKET) IN RELATION TO THE ENGINEERING PROGRAMME (DESIGN, IMPLEMENTATION AND IMPROVEMENT), ...

- Why add anything? Broadening the meaning of existing areas is to be preferred . Independent experts make best use of somehow open criteria. Otherwise external review becomes "checkbox ticking" and best experts will not participate any more.
- Employability of the Graduates (within the first and fifth year after graduation). Women's career development and professional growth (Gender dimension) Connections with the industry and business environment. Knowledge of other languages (not only mother tongue and English). Environmental and sustainability aspects.
- Use of the a real environment for student training (practical sets at a industrial scale onsite)
- The last year has demonstrated the importance of the following subjects:
  1) online study
  2) remote professional communication
  3) readiness to a distant working
- Online pedagogy or, at least, the implementation of hybrid engineering programmes (mixed face-to-face and virtual) should be one of the most challenges in the next years, including the definition of hybrid internships.
- I don't think you called out data science and analytics, which along with AI/ML methods for doing the analysis are becoming increasing important as tools, and as things that need to be better understood. I would also mention universal design, sustainability and the importance of diversity and inclusion, and their impact on professional practice.
- Distance learning could be assessed in more detail. How the needs of the labour markets are defined?
- Online engineering programs
- Computer science
- All engineers must have data science skills.
- Online engineering programmes
- IEA and WFEO have conducted a thorough review of the graduate attributes and professional competences. Engineers Ireland also reviewed our accreditation criteria and found similar results, e.g. sustainability/SDGs, data analytics and emerging technologies, lifelong learning, management. Alignment should be encouraged between ENAEE and the International Engineering Alliance accords with regards to definitions, standards, guidelines, procedures etc.
- No
- Increasing demands are being placed on engineering programmes to an extent that engineering graduates are failing to achieve a basic understanding of the underlying principles of engineering science and the context within which it is used. Therefore, of fundamental importance, is for engineering graduates to understand the environment in which engineers operate (social, economic, environmental) and how their work is impacted by and impacts on those environments. An engineering graduate should be able to take responsibility for their own learning, be able to recognise their limitations, and be able undertake critical analysis of a problem. Increasingly this is not the case. Therefore, more emphasis should be placed on
- problem identification, problem solving in a wide variety of contexts, and developing the skills they need to become interdependent learners.
- For online engineering programmes provide evidence of the real abilities achieved by the students/graduates
- -ability to work in a professionnal environment : effective and complusory internships in industry at least in Master's program, in order to confront the "theory" of the company seen in the course of study and the "real life", with the necessary multi-tasks processing of a young engineer.
- Apprenticeship engineering programmes and their on the job training elements
- Online engineering programmes, micro master programmes

SUBJECT AREAS TO BE COVERED IN ENGINEERING EDUCATION PROGRAMMES

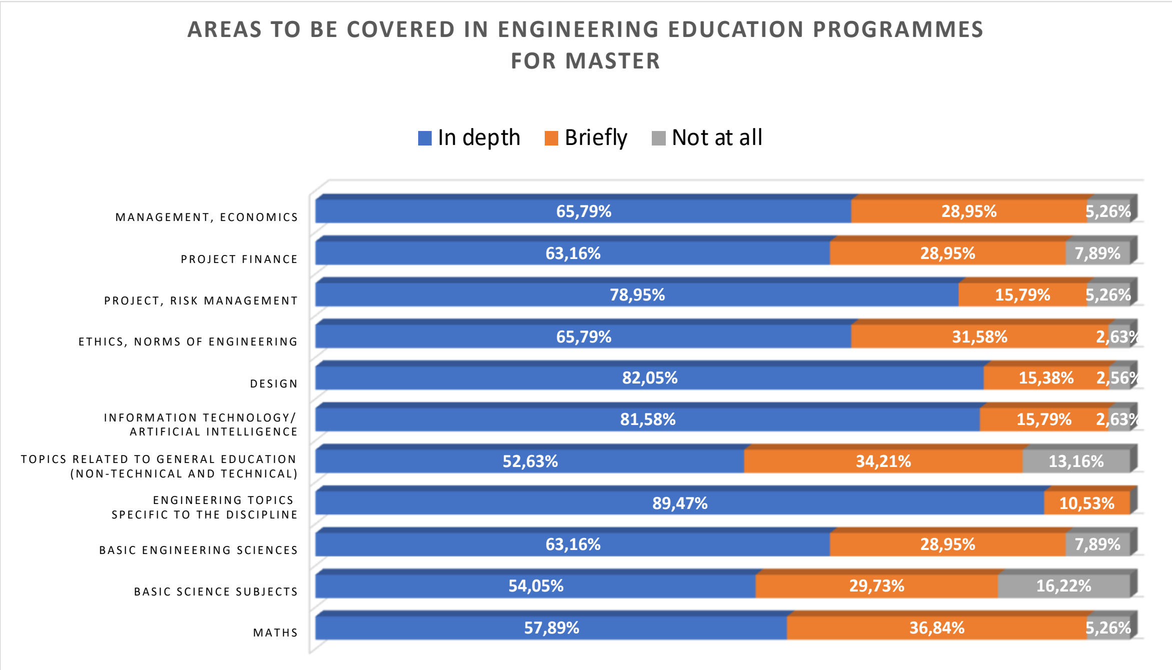
39 BACHELOR

Answered: 40



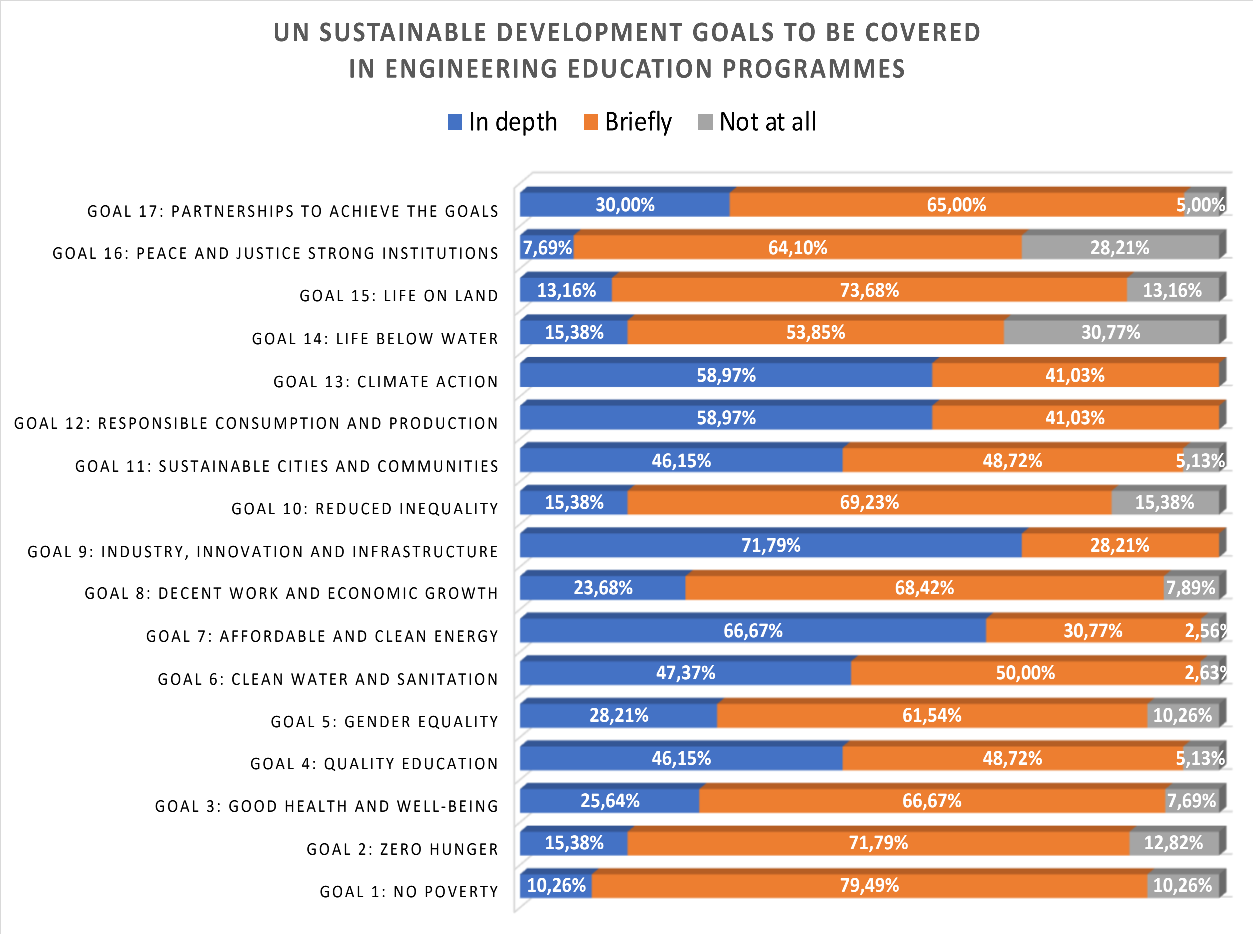
40 MASTER

Answered: 39



41 UN SUSTAINABLE DEVELOPMENT GOALS TO BE COVERED IN ENGINEERING EDUCATION PROGRAMMES

Answered: 40



42 HOW MUCH AND IN WHICH WAY SHOULD AN ENGINEERING STUDENT BE EXPOSED TO LABOUR MARKET AND OTHER PROFESSIONAL EXPERIENCES?

Answered: 32

- Include professional experiences among qualifications necessary to enter the programme, internships, invited speakers, etc.
- More than 25% of his time. Intership or project with industry
- An engineering student has to know:
  1) the potential companies and organizations (local and global) hiring the specific specialist
  2) the nomenclature of possible positions
  3) the responsibilities, competences and skills required for a normal working.
- Deep enough with the ability to use practical skills
- The exposition to professional experience has to take a very significative part of any engineering programme and can be implemented according specific internships, at least one for each year of the programme, between one and six months each, depending on the year, probably 6 months during the last year of Master. Interships should take place out of the university, in a company or a research institution.
- Through a within-programme period of not less than 3 months, but preferably about 6 months of in-industry professional paid work experience. The payment is important as it ensures that the industrial role is "real" and not just observational, and also not exploitative. Also, the work experience should be during the engineering programme, and not at the end, so that the students return and have a chance to both reflect on and evaluate their experience, as well as undertaking further learning that is now influenced by this experience.
- Some, not mandatory
- Very much
- Might change with discipline. On average 4-8 weeks work could be required.
- Two summer trainings
- At least once during the studies, the student should make a practice in an industry of the field of studies
- At least one semester's worth of an industry-based internship.
- Essential part of engineering in practise are for example internship and working life projects!
- It is very important (at least 5% of the student's work time).
  Internships should be available to all students. Schools and Universities should ensure that students get to know the industry and be in close contact with industry leaders and human resource specialists.
  Co-supervising Masters and End-of-degree projects with industry specialists. Students working on topics and problems owned by the industry.
  Part-time professors working in the industry always ensure that students are trained by professional engineers.
- As much as possible
- In depth
- Not relevant for our country. They all have a professional experience.
- 28 weeks
- Through summer practice. At least two times during the summer months.
- The students should benefit from a gradual exposure to the labour market and profit from gathering experience regarding the social interaction and professional dynamics in an on-the-job context.
  Due to limited competences, a bachelor student could have a first controlled exposure in the last year of the programme. In the same way, a masters student could develop their master thesis in cooperation with companies with much more independence and autonomy.
- At least six months, by practical placement/ internship
- Answer to question 41: depends on the nature of the respective engineering program
- Always to both
- In depth

42 HOW MUCH AND IN WHICH WAY SHOULD AN ENGINEERING STUDENT BE EXPOSED TO LABOUR MARKET AND OTHER PROFESSIONAL EXPERIENCES? (cont'd)

- Engineers Ireland has introduced a new programme outcome on Engineering Management: Knowledge and understanding of engineering management principles and financial
  decision-making relevant to the branch of engineering and an ability to apply these
  to one's own work and to the management of projects
  Indicative graduate attributes include:
  (i) knowledge and understanding of organisational structures, commercial governance and relevant legal
  principles and contractual arrangements;
  (ii) knowledge and understanding of the management of resources, including human resources;
  (iii) knowledge and understanding of project management and work planning and monitoring tools.
- Professional conduct is essential,
- Without this, it is impossible
- For bachelor: two-three months or a time sufficient to become familiar with a typical aspect of the relevant labor market
  For master: 4-6 months or a time sufficient to develop an application relevant for the specific sector
- Yes, I think an intership (at least 3 months) should be compulsory.
- Work placement for at least a six month period which implies a semester long, 30 credit work placement with defined learning outcomes and a work diary showing competencies attained
- Briefly, through interships.
- Include professional experiences among qualifications necessary to enter the programme, 4/2/2021 10:58 AM internships, invited speakers, etc.
- More than 25% of his time. Intership or project with industry
- An engineering student has to know:
  1) the potential companies and organizations (local and global) hiring the specific specialist,
  2) the nomenclature of possible positions,
  3) the responsibilities, competences and skills required for a normal working.

43 LEARNING OUTCOMES THAT SHOULD BE CONSIDERED MORE IN DEPTH FOR ENGINEERING PROGRAMMES DELIVERED ONLINE

Answered: 23

- Communication and team-working
- Basics science Be able to cooperate with a multicultural teams
- Engineering programs or particular subjects delivered online must provide the same level of 4/1/2021 8:50 PM knowledge, competences and skills as the traditional study on site (offline).
- Knowledge and understanding, Engineering analysis
- In online programmes, ways must *always* be found for the students to gain practical hands-on experience of doing real things in their particular field of engineering. This will clearly vary from one field to another, but with imagination and the exploitation of new technologies, invariably ways can be found for doing this now, where it might not have been possible in the past. In addition, I would rank the students having confidence in getting simple things working themselves, individually, in their field of study, above the development of sophisticated theoretical engineering concepts. Certainly there's a place for the latter, but fundamentally engineering is about synthesis - making things - and every students engineer must develop the required skills for design, judgement and debugging as an underpinning of any advanced knowledge and technology.
- No
- No
- Availability of IT infrastucture. Online TLA methods. Security of exams and student work.
- No, should be the same as presential programmes
- The implementation of the skills to practice
- Workshops
- Practical experience
- Yes : the ability to work collaboratively online and the development of resilience in relation to student loneliness.
- The relevance of the outcomes for each delivery method should remain roughly the same but the procedure for their assessment could be reviewed to better suit each methodology.
- I do not think the engineering programmes should be delivered entirely online
- As long as it is a mixed learning proces
- The standard applied must be independent of the mode of delivery, particularly as more institutions innovate in this area. This said, it would be understandable for certain learning outcomes to be given additional consideration for online programmes - assessors could keep an eye out for 'red flags'- in areas such as teamwork, communications skills and experimentation. While innovative tools have been developed for, e.g. collaboration and virtual/remote labs, these will likely have been more successfully deployed in some programmes than in others.
- None
- Yes
- Abilities to perform measurement/test with real instrumentation
- No
- Group work
Team work
Multi-disciplinary aspects
- Modern physics, programming and data science, ethics, humanities and social social sciences.
- Communication and team-working
- Basics science Be able to cooperate with a multicultural teams
- Engineering programs or particular subjects delivered online must provide the same level of 4/1/2021 8:50 PM knowledge, competences and skills as the traditional study on site (offline).

44 HOW CAN EUR-ACE LABEL BE USED TO FURTHER RECOGNITION OF GRADUATE COMPETENCE?

Answered: 28

- Make sure that EUR-ACE stands for close consideration of the market needs and certifies that teachers and programme managers are taking benefit of an internal quality assurance system of the labeled programme.
- For employability in industry
- The EUR-ACE label can be considered as an important part of young specialist's CV which demonstrates the international recognition of high quality level of the graduated engineering education.
- Mutual recognition of (the educational part) of professional qualifications, consumer protection, clarity of competences for clients and employers
- Expand further recognition of alumni competence, primarily for alumni for transnational programs
- By being recognised by international engineering regulators, registration and membership bodies for the purposes of mobility.
- EUR-ACE label should be recognized as a reference label for excellence of engineering programmes worldwide which could be a passport for :
  - the professional integration of Master students at the international level
  - the implementation of joint engineeringprogrammes at the european and international level, based on compatible standards.
- Sorry, I haven't thought about this sufficiently to give a useful opinion. (An engineer also needs to know their limitations!)
- It should be better known
- Further regulations for cross country engineering practice.
- Marketing: greater awareness within the industry and indeed the public, about what the EUR-ACE label means and how it relates to other "marks of quality" (most engineers I know are familiar with their national accrediting agency, and are familiar with e.g. Washington accord, but very few are familiar with what EUR-ACE means).
- Increasing the awareness of the label to the global industry and Universities
- ENAEE should engage with the industry, business associations and professional associations at national and European scales and communicate the accreditation models used to grant the quality label (EUR-ACE). Benchmarking studies to test the value and recognition of EUR-ACE with respect to other international and national quality labels should help identify its strengths and weaknesses.
  ENAEE should work closer to universities associations (CESAER, TIME,..) and collaborate in defining standards and international recognition.
  Studies to assess the value for degree-holders in their career development would shed light on the impact of having obtained an accredited program by EUR-ACE.
- Professional engineer status
- All EUR-ACE learning outcomes should be used as a basis for the construction of study programmes
- The EUR-ACE label must be recognised in each member state of the European Union for access to the engineering profession.
- It would be nice if it could be considered as a prerequisite for professional engineering (registration).
- Clear(er) set of benefits for HEI, Programmes and, particularly, for the graduates.
  Devise a system of inter-operability between other organizations, accreditation agencies and frameworks for easier access to the profession around the globe.
- The answer to this question I have summarized in the position paper on the future development of ENAEE
- As a guarantor of the quality of teaching and learning
- A competence parameter for the profession exercise
- Increased recognition of the label at national and international level. Increased alignment with IEA accords.
- Gain international recognition
- High quality
- Show evidence that the graduates from EUR-ACE accredited programmes are better equipped for their professional field.

44 HOW CAN EUR-ACE LABEL BE USED TO FURTHER RECOGNITION OF GRADUATE COMPETENCE? (cont'd)

- This label should reinforce its communication actions, and increase visibility = for ex. demand of logo on internet sites of accredited institutions and visibility of certificate in buildings. Maybe organise a meeting of all EU institution with EUR ACE labels (once every 2 years) to share experience and ideas to improve higher education. If the label is more visible, its requirements will be better known and will set a standard.
- I've no idea
- Promotion of the EUR-ACE label as a quality brand recognisable for its excellence
- Make sure that EUR-ACE stands for close consideration of the market needs and certifies that teachers and programme managers are taking benefit of an internal quality assurance system of the labeled programme.
- For employability in industry
- The EUR-ACE label can be considered as an important part of young specialist's CV which demonstrates the international recognition of high quality level of the graduated engineering education.
- Mutual recognition of (the educational part) of professional qualifications, consumer protection, clarity of competences for clients and employers