



**Report
of the Expert Panel
on the RE-ACCREDITATION
of the University Postgraduate (Doctoral) Programme
Graphic Engineering and Graphic Product Design**

Date of the visit to the Faculty of Graphic Arts, University of Zagreb:
June 7th, 2016

July, 2016

CONTENTS

INTRODUCTION..... 3
SHORT DESCRIPTION OF THE STUDY PROGRAMME 5
RECOMMENDATION BY THE EXPERT PANEL TO THE ASHE'S ACCREDITATION COUNCIL..... 6
RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME..... 6
ADVANTAGES OF THE STUDY PROGRAMME..... 7
DISADVANTAGES OF THE STUDY PROGRAMME 7
EXAMPLES OF GOOD PRACTICE..... 8
COMPLIANCE WITH THE PRESCRIBED CONDITIONS FOR THE DELIVERY OF A STUDY PROGRAMME..... 9
QUALITY ASSESSMENT 11

INTRODUCTION

The Expert Panel appointed by the Agency for Science and Higher Education (ASHE) created this Report on the re-accreditation of the university postgraduate (doctoral) programme *Graphic Engineering and Graphic Product Design* on the basis of the Self-Evaluation Report of the programme, other documentation submitted and a visit to the *Faculty of Graphic Arts, University of Zagreb*.

The Agency for Science and Higher Education, a public body listed in EQAR (European Quality Assurance Register for Higher Education) and a full member of ENQA (European Association for Quality Assurance in Higher Education), re-accredits higher education institutions (hereinafter: HEIs) and their study programmes in line with the Act on Quality Assurance in Science and Higher Education (Official Gazette 45/09) and the Ordinance on the Content of a Licence and Conditions for Issuing a Licence for Performing Higher Education Activity, Carrying out a Study Programme and Re-Accreditation of Higher Education Institutions (OG 24/10). In this procedure, parts of activities of higher education institutions and university postgraduate study programmes are re-accredited.

Expert Panel is appointed by the Agency's Accreditation Council, an independent expert body, to carry out independent evaluation of post-graduate university study programmes.

The report contains the following elements:

- A short description of the study programme,
- A recommendation of the Expert Panel to the Agency's Accreditation Council,
- Recommendations for institutional improvement and measures to be implemented in the following period (and checked within a follow-up procedure),
- A brief analysis of institutional advantages and disadvantages,
- A list of good practices found at the institution,
- Conclusions on compliance with the prescribed conditions of study programme delivery,
- Conclusions on compliance with the criteria for quality assessment.

Members of the Expert Panel:

- Professor Diana Gregor-Svetec, PhD, Faculty of Natural Sciences and Engineering, University of Ljubljana, Republic of Slovenia, Expert Panel Chair
- Professor Stefan Friedrich Herbert Brües, PhD; Faculty of Electrical Engineering, University of Wuppertal, Federal Republic of Germany
- Professor Robert Matthews Christie, PhD; School of Textiles & Design, Heriot-Watt University, United Kingdom of Great Britain and Northern Ireland
- Professor Diana Gregor-Svetec, PhD; Faculty of Natural Sciences and Engineering, University of Ljubljana, Republic of Slovenia
- Professor Reinhard Rudolf Baumann, PhD; Chemnitz University of Technology, Federal Republic of Germany
- Ewelina Katarzyna Pabjanczyk-Wlazole, doctoral candidate, Faculty of Material Engineering and Textile Design, Lodz University of Technology, Republic of Poland
- Ivana Carev, doctoral candidate, Faculty of Science, University of Zagreb, Republic of Croatia.

In the analysis of the documentation, site visit and writing of the report, the Panel was supported by:

- Ivana Borošić, coordinator, ASHE
- Ivana Šimić, assistant coordinator, ASHE
- Goran Briški, interpreter at the site visit and translator of the report, ASHE.

During the visit to the institution, the Expert Panel held meetings with the representatives of the following groups:

- Management
- Head of PhD programme
- Doctoral candidates
- Supervisors
- External stakeholders
- Alumni.

The Expert Panel also had a tour of the library, laboratories, IT rooms, student register desk and classrooms.

SHORT DESCRIPTION OF THE STUDY PROGRAMME

Name of the study programme contained in the licence:

Graphic Engineering and Graphic Product Design

Institution providing the programme:

University of Zagreb

Education provider(s):

Faculty of Graphic Arts, University of Zagreb

Place of delivery:

Getaldićeva street 2, 10 000 Zagreb

Scientific area and field:

Technical Sciences,

Field: Graphic Technology

Learning outcomes of the study programme:

Not defined

Number of doctoral candidates:

61

Number of teachers:

38 (all the teachers)

Number of supervisors:

22 (only 17 represented in the table 2/5 retired)

RECOMMENDATION BY THE EXPERT PANEL TO THE ASHE'S ACCREDITATION COUNCIL

Upon the completion of the re-accreditation procedure and the examination of the materials submitted (Self-Evaluation Report etc.), site visit to the higher education institution and interviews conducted with HEI members, in accordance with the visit protocol, the expert panel renders its opinion in which it recommends to the Accreditation Council of the Agency the following:

3. to **issue a letter of recommendation** for the period up to three (3) years, in which period the higher education institution should make the necessary improvements.

A suspension of student enrolment in the first year of doctoral study programme for 1 year is recommended.

RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME

1. A significantly improved, more focused research strategy of the faculty is needed; the doctoral study programme needs to be aligned with this new, improved research strategy.
2. Strengthened and more formalised quality assurance procedures are needed.
3. Rules and procedures regarding the revoking of the academic title, plagiarism and ethical issues in research should be defined at the faculty level. A formal procedure to identify possible plagiarism should be developed. Ethics policy related to research should be explained in detail.
4. Learning outcomes of doctoral study programme should be defined.
5. Doctoral study programme should enable PhD students to acquire competences aligned with the level 8.2 of the CroQF, meaning that in addition to acquiring knowledge and developing cognitive and practical skills, social skills and responsibility should also be developed. Acquisition of general (transferable) skills should be more included into the study programme (e.g.: project planning and management competencies, applying for funding, communication skills, etc.).
6. Effort to improve research infrastructure is required. PhD students should be encouraged to make part of research abroad, in institutions which are equipped with modern research equipment.
7. There is little ongoing financial support from projects, and significant effort will be required to ensure projects and financing of PhD students, in order to sustain the doctoral study programme.
8. Strategy should be developed to diversify the sources of founding.
9. The quality of publications of teachers should be improved, by publishing in high-quality journals (CC, SCI, SCI-Extended).
10. The number of taught courses should be reduced, ECTS credits at courses should be harmonized and number of ECTS credits obtained at courses should be adapted to legal requirements.
11. Consideration needs to be focused on appropriate balancing of supervision and teaching workloads.
12. Contractual framework of shared responsibilities between PhD students, supervisors and faculty is needed.

13. Formal system to get feedback on doctoral programme quality and supervisors should be introduced on the faculty level, and the results thereof analysed and subject to further consideration by independent persons.
14. Formal system for conflict management between PhD students and faculty/supervisors, including independent examination of individual cases and appeals, should be introduced.
15. The anonymous complains of PhD students regarding quality of doctoral study, quality of doctoral theses, as well as work and quality of some supervisors should be taken into consideration.

ADVANTAGES OF THE STUDY PROGRAMME

1. Some improvement are noticeable since previous evaluation of HEI.
2. The unique doctoral study program in the region, with a big potential to enrol both national and international PhD students.
3. Faculty promotes publication of PhD students' research work in journals and oral presentations in international conferences.
4. The visibility and accessibility of defended doctoral thesis is broader due to digital form and inclusion in repository.
5. Good thesis submission, defence and assessment procedures are provided.

DISADVANTAGES OF THE STUDY PROGRAMME

1. Admission quota of PhD students are not based on analysis of market needs.
2. Weak strategy to develop the doctoral study programme.
3. Doctoral study programme should take more into account the structural change in Graphic Arts to the digital media.
4. Faculty did not present clear, rigorous, formal mechanisms and procedures that are in place for reviewing quality - inadequate quality assurance procedures generally.
5. No project funded research, national or international, is currently running.
6. International cooperation in research is low and is quite diverse among teachers and supervisors.
7. A quite low number of scientific publications in journals with a high impact factor is observed.
8. Excessive overload of some teachers is observed.
9. Learning outcomes of doctoral study programme are not defined.
10. High number of taught courses, and excessive diversity in ECTS credits.
11. Acquisition of generic (transferable) skills is not promoted enough and not evaluated in the doctoral study programme.
12. PhD students are not recruited internationally.
13. Low international participation of PhD students and teachers in the doctoral study programme.
14. Writing reports on PhD students' research work is just a formality for supervisors and the Faculty.
15. The feedback from PhD students on doctoral study programme and supervision is not collected with the attention to analyse it and get some feedback for improvement.
16. Faculty does not monitor the careers of its doctoral graduates.
17. Procedure for detecting plagiarism needs to be better defined.
18. Financial constraints and non-transparency.

EXAMPLES OF GOOD PRACTICE

1. Excellent point is that the Faculty of Graphic Arts has its own repository, a digital collection of full versions of doctoral, master's diploma and final works of employees/students.
2. Faculty of Graphic Arts is publisher of an academic peer-reviewed open access journal Acta Graphica, in which PhD students can publish, in cooperation with their supervisors, and obtain high visibility of their research work.
3. Faculty of Graphic Arts organizes an international conference where PhD students have the opportunity to present their research work.

COMPLIANCE WITH THE PRESCRIBED CONDITIONS FOR THE DELIVERY OF A STUDY PROGRAMME

| Minimal legal conditions: | YES/NO notes |
|--|------------------------|
| 1. Higher education institution (HEI) is listed in the Register of Scientific Organisations in the scientific area of the programme, and has a positive reaccreditation decision on performing higher education activities and scientific activity. | YES |
| 2. HEI delivers programmes in the two cycles leading to the doctoral programme, i.e., first two cycles in the same area and field/fields (for interdisciplinary programmes), and employs a sufficient number of teachers as defined by Article 6 of the Ordinance on the Content of a Licence and Conditions for Issuing a Licence for Performing Higher Education Activity, Carrying out a Study Programme and Re-Accreditation of Higher Education Institutions (OG 24/10). | YES |
| 3. HEI employs a sufficient number of researchers, as defined by Article 7 of the Ordinance on Conditions for Issuing Licence for Scientific Activity, Conditions for Re-Accreditation of Scientific Organisations and Content of Licence (OG 83/2010). | YES |
| 4. At least 50% of teaching ,as expressed in norm-hours, is delivered by teachers employed at the HEI (full-time, elected into scientific-teaching titles). | YES |
| 5. Student: teacher ratio at the HEI is below 30:1. | YES (13.5:1) |
| 6. HEI ensures that doctoral theses are public. | YES |
| 7. HEI launches the procedure of revoking the academic title if it is determined that it has been attained contrary to the conditions stipulated for its attainment, by severe violation of the studying rules or based on a doctoral thesis (dissertation) that has proved to be a plagiarism or a forgery according to provisions of the statute or other enactments. | YES |
| Additional/ recommended conditions of the ASHE Accreditation Council for passing a positive opinion | YES/NO notes |
| 1. HEI (or HEIs in joint programmes) has at least five teachers appointed to scientific-teaching titles in the field, or fields relevant for the programme involved in its delivery. | YES |
| 2. In the most recent re-accreditation, HEI had the standard Scientific and Professional Activity (e.g. Artistic for those in the arts field) marked as at least "partly implemented" (3). | YES |
| 3. The doctoral programme is aligned with the HEI's research strategy. | YES |
| 4. The candidate : supervisor ratio at the HEI is not above 3:1. | YES (61:22 – 2.8:1) |
| 5. All supervisors meet the following conditions: a) PhD, elected into a scientific title, holds a scientific or a scientific-teaching position and/or has at least two years of postdoctoral research experience; b) active researcher in the scientific area of the programme, as evidenced by publications, participation in scientific conferences and/or projects in the past five years (Table 2, Supervisors and candidates); c) confirms feasibility of the draft research plan upon admission of the candidate (or submission of the proposal); d) ensures the conditions (and funding) necessary to implement the candidate's research (in line with the draft research plan) as a research project leader, co-leader, participant, collaborator or in other ways; e) trained for the role before assuming it (through workshops, co-supervisions etc.); f) received a positive opinion of the HEI on previous supervisory work. | YES |
| 6. All teachers meet the following conditions: a) holds a scientific or a scientific-teaching position; b) active researcher, recognized in the field relevant for the course (Table 1, Teachers). | YES |
| 7. The supervisor normally does not participate in the assessment committees. | YES |

| | |
|--|------------|
| <p>8. The programme ensures that all candidates spend at least three years doing independent research (while studying, individually, within or outside courses), which includes writing the thesis, publishing, participating in international conferences, field work, attending courses relevant for research etc.</p> | <p>NO</p> |
| <p>9. For joint programmes and doctoral schools (at the university level): cooperation between HEIs is based on appropriate contracts; joint programmes are internationally recognized, and delivered in cooperation with accredited HEIs; the HEI delivers the programme within a doctoral school in line with the regulations (it is based on contracts in the case of multiple institutions, and the HEIs ensure good coordination aimed at supporting the candidates); at least 80% of courses are delivered by teachers employed at HEIs within the consortium.</p> | <p>N/A</p> |

QUALITY ASSESSMENT

1. RESOURCES: TEACHERS, SUPERVISORS, RESEARCH CAPACITIES AND INFRASTRUCTURE

1.1. IMPROVEMENTS ARE NECESSARY

Scientific achievements in the discipline are evident from the quantity of publications of teachers in the past 5 years: 681 papers in the field of graphic technology; that is 18.5 publications/teacher. However, the performance is not homogeneous across the teaching staff, and it would be desirable to raise performance where appropriate to ensure the uniformity of standards. Researchers have been involved in international (4 COST, 5 bilateral projects, 1 IPA and 1 IPIP) and 8 national projects, which ended in 2013. They participate in international organizations (EFPRO, IARIGAI), associations and committees (PIA, PIRA, TAPPI, IS&T, TAGA, FOGRA, UPA, GATF/GAIN). The Faculty of Graphic Arts has signed Erasmus cooperation agreement with 22 institutions and is partner in CEEPUS network. Although some international cooperation has been established, there seems to be very little mobility and cooperation is limited to few specific fields of graphic technology. However, it is a weakness that no international project funded research have been realised and that there are no new funded projects running at present to ensure sustainability. There are no projects funded by National Foundation of Science, nor is there a strategy for applying for new projects.

It is commendable that the Faculty of Graphic Arts is publisher of an academic peer-reviewed journal *Acta Graphica*, which is cited in several databases, as this gives the opportunity for teachers and PhD students to publish. The Faculty of Graphic Arts annually organizes an international conference “The International Conference on Printing, Design and Graphic Communications Blaž Baromić” and is co-organizer of three other international conferences. This is commendable, but unfortunately the Expert Panel had no opportunity to check the quality of the conference papers.

COST training school and COST project meeting were organized by the Faculty of Graphic Arts, which seems to be work of only a few individuals and not the usual practice and commitment of the Faculty as a whole.

1.2. IMPROVEMENTS ARE NECESSARY

The number and workload of teachers are monitored by the Faculty of Graphic Arts’ management. A total of 30 out of 38 teachers involved in the doctoral study programme (80%) are employees of the Faculty of Graphic Arts. The total teaching workload is 366 hours/teacher, and for most teachers is below recommended 350 hours. Two extremes are evident: 220 and 360 hours over the limit. From 17 active supervisors, 6 have just a little higher workload than 350 hours (from 25 to 37 hours), which is acceptable. Only one of the supervisors has extremely high overload, currently 710 hours.

Though monitoring of teaching workload is carried out, it should be improved in a way that no such excessive overload is present.

1.3. IMPROVEMENTS ARE NECESSARY

In the past 5 years, teachers published 681 scientific publications in the field of graphic technology, i.e. 18.5 scientific publications/teacher. Among those publications, the majority - 57% - are papers based on conferences, while 27% are publications in journals with the impact factor (CC, SCI, SCI-Expanded). Though quantity of published papers is quite high, the quality of publications seems to be quite low, as most of them are not published in high quality journals. Also, the number of publications in high quality journals per teacher is quite diverse among teachers.

There are several recent appointments at associate professor level, replacing the retiring staff, who require support in developing an appropriate staff profile.

1.4. IMPROVEMENTS ARE NECESSARY

The number of supervisors on doctoral study programme is adequate. A total of 22 supervisors (five of whom are now retired), supervised 31 PhD students, which means that the ratio is below 3:1. Completion rate is high; 22 PhD students have successfully completed the study, 9 are in the process of finishing.

The number of high quality publications relevant for the research field is low; 17 active supervisors have 3.8 publications/supervisor/year. Among those, 28% are published in journals with the impact factor cited in WoS, Scopus, which means 1 publication/supervisor/year. This is around the minimum acceptable level.

The participation of supervisors in international and national research projects is low. Five supervisors participated in international projects and all active supervisors participated in more than two national scientific research projects. From presented documentation it was not clear if supervisors actively lead projects or only participated in them.

Publications of PhD students arising from doctoral research could not be assessed, because the Table 2 listed all publications of PhD students, and not only those connected to doctoral research.

1.5. IMPROVEMENTS ARE NECESSARY

Competences and the qualifications of teachers/supervisors are assessed through revision of their CVs, course programme description and their work by Faculty Commission for doctoral studies. Supervisors are assessed by students (Form PhD04), but there is room to improve the process to ensure a more honest response, for example by allowing anonymity.

Amendments to the Ordinance on doctoral studies are in place, aiming to regulate the responsibilities of all teachers on the doctoral study programme.

Though formal mechanisms of assessing and monitoring of teachers/supervisors are in place, they should be improved in a way to encourage development of individual performance above minimum standards.

1.6. IMPROVEMENTS ARE NECESSARY

The Faculty library holds around 8000 books and 41 subscriptions to journals relevant to the research field. An excellent feature is that the Faculty of Graphic Arts has its own repository, a digital collection of full versions of doctoral and master's theses, and final works of employees/students. There is no data available concerning access to databases. Some students commented on difficulties in accessing literature that is not available within the Faculty. Students also commented that they have no opportunity to access databases and scientific literature unless they come to the Faculty of Graphic Arts. This reduces the opportunity for good scientific work and research. It is recommended to give students opportunity to have access also outside of the Faculty of Graphic Arts, as it is a good practice in the scientific community.

Most of the equipment that was presented at site visit is measuring equipment for practical courses on 1st, 2nd and 3rd level. Some of the equipment is state-of-the-art research equipment, for example in laboratory for recycling of printed graphic papers and laboratory for security printing. On the other hand, a lot of the equipment concerning graphic engineering area should be updated and adjusted to current trends in research.

2. INTERNAL QUALITY ASSURANCE OF THE PROGRAMME

2.1. IMPROVEMENTS ARE NECESSARY

The doctoral study programme "Graphic Engineering and Graphic Product Design" has been approved and launched in line with the national regulations in 2007. There is little evidence that the Faculty of Graphic Arts has rigorous formal procedures in place to analyse and identify the range of needs. In the Self-Evaluation Report the needs for launching the programme were stated, but the analysis of scientific/artistic, cultural, social, economic and other needs is not adequate (the needs are not clearly identified). There is no clear analysis of social, academic, economic or other needs of community, neither

in Quality Research Strategy nor in Development Strategy of Faculty of Graphic Arts, that would justify the launching of this programme. The Faculty of Graphic Arts claims to be the only postgraduate scientific programme in the field of “Graphic engineering” in Croatia. This may be correct, but there is a decreasing need for research in the field of traditional Graphic Arts (GA); research should be directed to new topics, such as new printing materials, special printing applications, packaging, graphic design and multimedia. There is evidence for reasonable cooperation with industry nationally, which suggests an untapped potential of the Faculty of Graphic Arts. However, it would be desirable to enhance the collaboration further, leading to industry-based projects that could also provide a financial support to the Faculty of Graphic Arts.

2.2. IMPROVEMENTS ARE NECESSARY

The Faculty of Graphic Arts presented a rather bland research strategy document. The strategy identifies the general direction, which is in keeping with relevant contemporary development of the discipline, but is weak on details. There is limited evidence of the consideration of topics on which the Faculty and doctoral study programme aim to focus. Individual PhD study mainly reflect supervisors’ interests, although appear to be aligned with the strategy, in general terms.

The doctoral study programme as described in the self-assessment document is aligned with the statements on mission and vision in the research strategy, as well as the development strategy of Faculty of Graphic Arts. Research Strategy and Development Strategy promote good perspective in research and PhD study, but during the site visit it was not clear how the PhD students, supervisors and doctoral study programme contribute to the strategic plans. During the site visit it was observed that supervisors do not have any research projects and they were not familiar with the future perspective of fundraising of research and PhD study research. Although they stated that they want to apply for national research grants, there were no supervisors who applied for a recently closed grant call and none of them clearly declared that they will apply to the next call. Only two supervisors were involved in one EU project, which is not a research funding project. In self-assessment report, only past projects were stated. There should be more specific examples on how the doctoral study programme will promote quality research and development strategy of the Faculty of Graphic Arts. Research foundations of doctoral education should be assessed, along with the quality of the research strategy, and should focus on programme content that promotes quality research and development strategy of the Faculty of Graphic Arts.

The statement on fundamental task of the doctoral study programme as to develop the economy through innovation, to contribute to the overall development of society on the basis of high academic value and ethical criteria, should be supported with at least innovations and patents of PhD students and supervisors.

In general, the Expert Panel got the impression that the Faculty has no dedicated vision to move its research along with the radical migration process in Graphic Arts towards a media industry. On the way from conventional printing to more specialized areas of research (e.g. functional printing, digital media) Faculty has neither necessary equipment nor much competence. The Expert Panel observed some promising approaches in the field of material research, packaging and especially in security printing. The Self-Evaluation Report of the Faculty claims to move from traditional Graphic Arts to “new ways of visual communications”, but they still have most research competences in the field of traditional graphic technology.

2.3. IMPROVEMENTS ARE NECESSARY

The Faculty of Graphic Arts claims to monitor the success of the doctoral study programme. The monitoring is done by the Commission for Quality Management (CQM) and is reported in the Annual Report. The University of Zagreb carried out the review of doctoral study programmes in 2014/15. The scientific productivity of supervisors and PhD students is periodically monitored through ASHE and annual reports. PhD students confirmed that they have to fill out form once a year. Feedback from

students is gathered regularly although it does not involve anonymity, which questions the reliability of the presented results.

No statistics or systematic evaluations were presented to the Expert Panel as a result of this monitoring process. The Faculty does not present clear, rigorous, formal mechanisms and procedures that are in place for reviewing quality.

No examples of changes due to a quality control process could be observed by the Expert Panel, but they may exist.

2.4. IMPROVEMENTS ARE NECESSARY

There are mechanisms in place to monitor and assess supervisor performance, but they could be strengthened in terms of rigour and formality. The supervisor is required to submit an annual report on the work of a PhD student and present the students' scientific success. Documents presented at site visit showed that reports are very superficially prepared, mostly containing just one sentence describing annual work of a PhD student. It seems that writing report is just a formality for supervisors and the Faculty.

The quality of the doctoral study programme is assessed by the number of papers published with the supervisor. As no data about such joint publications resulting from PhD research topic was presented in documents and at site visit, Expert Panel could not assess the number and quality of joint publications.

The feedback from students on the quality of supervision, based on surveys, is generally positive, although there are a number of individual instances of criticism, sometimes quite negative. The Expert Panel received a significant number of anonymous complaints about the quality and integrity of supervisors.

Completion rate appears reasonable, although it is conceded that there are issues with industry-based students.

The Faculty should establish an independent mechanism to ensure an appropriate level of supervision within the doctoral education process, with particular emphasis put on industry-based students.

2.5. IMPROVEMENTS ARE NECESSARY

There is an issue that plagiarism software is not available in the Croatian language. It is highly recommended that the Croatian academic community should be working on such a tool in the short term.

No substantial alternative assessment procedures were presented convincingly. In the Self-Evaluation Report it is stated that faculty members must guarantee the authenticity of the published scientific papers attributed to them, and the accuracy and honesty in the presentation of information on the origin of ideas and arguments that have been used in the work. However, the procedures that assure academic integrity and freedom of research were not presented.

The Ethics Committee has been established on the Faculty level, which is a good first step.

The formal and clear procedure for conflict solving between PhD students and the Faculty (supervisors, teachers) must be introduced, including the higher instances (e.g. filing an appeal to the University Senate), and the possibility of introducing an external observers (independent from the Faculty). Also, the decision making in this process should be carried out by independent persons/entities.

2.6. HIGH LEVEL OF QUALITY

There are clear formalised procedures for developing and defending the thesis proposal, which are in line with institutional arrangements. In the evaluation of doctoral thesis, one member of commission is external, from another institution. Presentation of doctoral thesis is public, with minutes signed by commission members.

2.7. IMPROVEMENTS ARE NECESSARY

Good procedures are adopted for doctoral thesis assessment.

After the PhD student has fulfilled all his/her obligations at the doctoral study programme and paid full tuition fee, she/he submits the thesis along with the supervisor's written consent and review of the

completed research and achieved original scientific contribution to the registry office of the Faculty of Graphic Arts. The Faculty Council appoints the assessment committee for the thesis defence. The proceedings of thesis defence are recorded.

Participation of external or international examiners in the thesis defence committee is encouraged, and in some cases also results in publishing of a scientific paper.

The Faculty of Graphic Arts encourages candidates to have at least one publication with an internationally competitive peer-review in the field of thesis, prior to completion of doctoral education.

Alternative thesis presentation models are acceptable, although it does not appear that there is much demand for this, with apparent unanimous favour for the traditional model.

Students who decide to write thesis in English language, should not be discriminated in any case, the certified translation should be covered by Faculty of Graphic Arts.

The range of doctoral theses inspected indicated good quality comparable with other institutions, though not all doctoral theses have reached high quality. The Expert Panel got some complains from PhD students about low quality of some doctoral theses.

2.8. HIGH LEVEL OF QUALITY

The procedures appear strong and appropriate. All the necessary information on study programme are available on Faculty of Graphic Arts' website.

2.9. IMPROVEMENTS ARE NECESSARY

The tuition fees are prescribed by the Decision of the Faculty Council; fees amount to 10,000.00 HRK per semester; for a total of 6 semesters the fees amount to 60,000.00 HRK. For PhD students who are employed full-time at the Faculty of Graphic Arts, and were elected to the associate title of assistant professor, tuition costs are borne by the Faculty of Graphic Arts.

The tuition fees are in accordance with tuition fees of similar doctoral studies in technical areas. PhD students and supervisors claimed that this is a fair amount for a PhD study. It is necessary to state that most of the students are employed by the Faculty of Graphic Arts and do not need to pay the tuition fee themselves. The way in which tuition fees are spent is not completely transparent and is not clear to the PhD student.

It is stated that tuition fees of doctoral studies cover the costs of tuition, the cost of registering, assessment and defence of the thesis, and costs of experimental work. The cost of performing experimental work is done in agreement with the supervisor and approved by the Faculty Management. During the site visit it was observed that PhD students have no influence and are not involved in decision-making process on how the tuition fees are spent. Some PhD students from industry mentioned that they have covered some of their costs of research. The existence of PhD student fund was not declared and students do not have clear and transparent procedure to follow if they want to apply for financial support provided from the tuition fees for participation in mobility (for congresses or research visit). It is important to mention that some of the PhD students participated in international congresses and tuition fees were covered by the Faculty of Graphic Arts; PhD students stated that they can participate in such activities when they have some research results to present. Some of the students stated they participated in mobility programme (COST) as listed in Self-Evaluation Report document. The general finding is that there are some good practices but that they mostly depend on supervisor and not on a regular faculty level. System of funding the doctoral study programme and the PhD students within the institution should be more transparent and more sustainable.

It does not seem that the Faculty of Graphic Arts has a stable funding position. It is clear that there are funding constraints within the system, exemplified by a lack of new project funding, and limited evidence of staff commitment towards funding applications. There is an urgent need to expand funding opportunities from a range of sources, to sustain the quality of the doctoral study programme in the future.

2.10. IMPROVEMENTS ARE NECESSARY

Fees appear to be set at an appropriate level, though there is no evidence that real costs of study are determined on the basis of transparent criteria. Criteria were not stated, neither in the Self-Evaluation Report, nor during the site visit. In the Self-Evaluation Report, a table with costs is partially filled, presenting high diversity in income and outcome. Clear criteria on how money is declared for specific sections is not stated. It is obvious that there is more income than money spent on cost of the study in past 4 years, with higher difference in *Funds from tuition fees -total costs* of cca 160 000 HRK (cca 22 500 EUR) in 2014/2015. In the sections in tables the existence of student fund was not declared. Cost of research and teaching present 17-29% of the total funds from tuition fees, with highest percentage of 63% spent on research in 2010/11. It is not clear from which criteria this percentage and difference were generated.

3. SUPPORT TO DOCTORAL CANDIDATES AND THEIR PROGRESSION

3.1. IMPROVEMENTS ARE NECESSARY

The Faculty of Graphic Arts establishes admissions on the basis of the number of available supervisors and their teaching workload. Teaching workload of some supervisors is more than standard workload, prescribed by existing legal thresholds. Consideration needs to be focused on appropriate balancing of supervision and teaching workloads.

However, although the faculty claims that obligations of supervisors are clearly defined by Ordinance of doctoral studies of the University of Zagreb, and additionally defined by the Ordinance 2015 of the Faculty of Graphic Arts (of 18 November 2015), the Faculty did not prove to have any document defining distinction of supervisors' and PhD students' obligations and rights.

In both Ordinances, the main focus is on students' obligations and less on supervisor's obligations and student rights. Contract that students sign with the Faculty of Graphic Arts relates to the financial obligations only. Therefore, it is recommended to prepare a contract between all parties involved (student, supervisor and Faculty), which clearly defines rights and obligations of students and supervisors, including the appeal paths to higher instance – Faculty Council. It will allow to maintain the transparency of the admission process and doctoral studies, and improve the quality of doctoral training in general.

During site visit it was observed that the supervisors did not have any clear criteria to fulfil and be selected as supervisors, except the minimum criteria prescribed by the State. Moreover, the quality of supervision is arguable – many supervisors are inactive scientists. It is also recommended to put more focus in the selection of supervisors who are active researchers, with current record of scientific research. As currently supervisors have no project founded research and are not encouraged toward the scientific excellence, that is not encouraging for PhD students to develop good research oriented skills. Quality of supervisors is assessed by relevant publications, which suits the PhD students' research proposal, and the publications in A class journals. It is evident from documentation that the majority of supervisors' publications are either articles in low ranking journals or conference papers. Faculty of Graphic Arts should provide clear criteria on how it takes into account the quality of supervisors - if their competencies suit the students' research proposals.

3.2. IMPROVEMENTS ARE NECESSARY

As there is no analysis of social, academic, economic or other needs of the community that would justify this programme, there is no convincing evidence in either Quality Research Strategy or Development Strategy of Faculty of Graphic Arts that the level of admission quotas are based on analysis of scientific, cultural, social and economic needs of community or employers, especially in industry. More concrete evidence is needed that PhD students will be able to respond to technological, social, economic and market needs in Croatia as well as in the EU. As already mentioned, these projections seem more intuitive than based on the market needs.

It seems that at the Faculty of Graphics arts a phenomena of “increasing trend in the admission of the PhD students” is followed, without considering how will this affect the quality of doctoral study. Also, the vague

statement “To our knowledge there are no unemployed PhD holders in the field of graphic technology” is not evidence-based in any statistical reports or other type of data. The Faculty of Graphic Arts does not monitor the careers of its doctoral graduates. There is no evidence on how many PhDs are employed in research and development positions in the public and private sector. At the interviews with students, the Expert Panel found that some of them were founders of or employees at various companies, who started their PhD study with the hope of transferring the acquired knowledge and technology to their respective companies. This presents a good potential for establishing a number of innovative companies by PhDs.

There is limited uptake of graduates by the industry due to the financial constraints and opportunities for research in the Croatian industry, as currently structured. It would be appropriate to develop mechanisms for knowledge transfer for future industrial exploitation.

As admission quotas should be based on wider analyses of scientific/artistic, cultural, social and economic needs of community, the Faculty could start monitoring the careers of its graduates, e.g.: the number of unemployed PhDs; the number of PhDs employed in research and development positions in the public and private sector; the number of research projects carried out with the business sector, HEIs and public research institutes, serving as a basis for a part of the admission quota, etc.

3.3. IMPROVEMENTS ARE NECESSARY

Scientific projects mentioned in Self-Evaluation Report - 36 scientific projects - refer to a closed period and the Faculty of Graphic Arts is strongly recommended to search for funds and apply for grants/projects for future PhD students enrolment, either from national or international scientific research support funds. The Faculty of Graphic Arts has no research projects running at the moment, which presents a high risk of low quality research for PhD students. It is obvious that the Faculty of Graphic Arts does not establish the admission quotas on the basis of the available funding, because there are no projects currently running. In the past nationally funded research projects (36 projects funded by the Ministry) significantly contributed to the Faculty of Graphic Arts' funding, however, because of lack of state funding in recent years, the situation has changed. Also, the Faculty of Graphic Arts has not provided any evidence of data collected on distribution of funds coming from the tuition fees, as well as the share of project and other types of funding in financing the programme. Finally, no official information was provided on how many PhD students were self-funded (and only 9 out of 48 were somehow financially supported), however the results of the interviews show that the number of self-funded PhD students is prevailing, which is considered as a negative phenomenon.

Apart from the general recommendation of increasing the amount of funding intended for science and doctoral training from public resources, the staff of the Faculty of Graphic Arts is recommended to apply for European grants, which are available to anyone, and bring a lot of possibilities to improve the financial situation of the institution, quality of research, as well as the PhD students' conditions.

Since there is no research funding through the projects available for candidates, except self-funding and potential business cooperation and research funds, the admission quotas should be reconsidered and planned very carefully. It is also recommended to significantly increase the number of fully funded PhD students, instead of increasing the number of self-funded PhD students.

The statement that “PhD candidates were granted financial support: 7 PhD candidates for their PhD research, 2 for participation in conferences” indicates there might have been a sort of student fund, but there are no clear criteria and evidence on how student can apply for this finances and if the criterion of equality of access to such funds is retained.

3.4. IMPROVEMENTS ARE NECESSARY

The number of prospective candidates willing to pursue the doctoral training at the Faculty of Graphic Arts is low, and every candidate is provided with a potential supervisor after enrolment into the doctoral study programme. The process and procedures of assigning supervisors and developing topics and plans are appropriate. The average time for research topic development and for project completion appears

long by some international standards, but is in line with the national standard, though some students complain the procedure was too long for them.

Although it is stated that candidates are encouraged to choose their study counsellors from the list of staff at the admission to doctoral study programme, it is not clear how the candidate can choose the best study counsellor for himself/herself at that point. In order to ensure the supervisor with high quality of the competencies, it is recommended to state clear criteria for supervisors.

There is research planning, but reporting of individual progress is often cursory. Completion rates are reported to be high, but are not quantified.

The clear criteria for supervision of the PhD students and progress tracking are doubtful – Faculty of Graphic Arts has not proved to have a clear procedure of monitoring the PhD students throughout the process of training. The Faculty of Graphic Arts claims that this is defined at the national level and implemented primarily through the OBAD system. However, the Expert Panel was unable to check whether these documents were verified (instead of just collecting it) by any other person or higher instance.

In addition to the OBAD system of monitoring the work and progress of PhD students and supervisors, it is suggested to use more objective feedback from students on the supervisors and vice versa. As stated by both students and supervisors, OBAD system monitoring presents a sort of formal evaluation implemented on University level, with no consequences and real feedback on student/supervisor relationships. It is recommended to create a system of checking the OBAD results and monitor the progress of PhD students in reality by appointing the responsible person and/or instance for considering these reports. The anonymous questionnaires implemented on this level of education might be a good tool for evaluation.

It is recommended to introduce the regular meetings and presentations of PhD students with their supervisors and within the group of PhD students that would help them to check the progress (also for supervisor) and discuss any problems that occurred during the research.

3.5. IMPROVEMENTS ARE NECESSARY

The Faculty of Graphic Arts has written terms and conditions of admission of PhD students. Preference is given to candidates with high grade point average at the graduate level, and to candidates who provide letters of recommendation from relevant experts in the scientific field. Other determining factors are knowledge of English and a motivation interview with candidates where they prove their interest towards a career in scientific research (presentation of published scientific work if existing).

But because there is very low number of candidates willing to start doctoral studies at the Faculty of Graphic Arts, every candidate that meets the general criteria is accepted. Although the Faculty claims to recruit motivated candidates internationally, the open call for candidates at the named website in Self-Evaluation Report is in Croatian and the range of media to which the open call was advertised was not clearly defined. International students are not encouraged to participate in programme, as there is no application in English. As the doctoral study programme is declared as the only one in the region, this might be used to recruit the best candidates from the region and worldwide, if the admission process would be oriented towards these kind of students and prepared in English.

It is recommended to release such open calls (together with documentation) in international language – English, so that every interested candidate would be able to answer to this call. It also should involve the preparation of study programmes in English, organizing Open Days for prospective candidates, providing the necessary academic staff for this purpose and introducing the proper marketing strategy to encourage foreign students to apply.

3.6. IMPROVEMENTS ARE NECESSARY

The admission process at the Faculty of Graphic Arts is public, however there is no real selection of candidates due to the fact that there are only few candidates per year, so the Faculty of Graphic Arts accepts every applicant. The Faculty of Graphic Arts failed to present ways in which it ensures that the

best applicants are admitted, as well as mechanisms of identifying them. According to the Self-Evaluation Report, the Faculty of Graphic Arts conducts interviews with prospective candidates, however a lack of interview was raised during the discussion with PhD students. It is recommended to introduce the interview in admission process as one of the quality assurance mechanisms.

Reasonable procedures are reported and implemented, although there is room for improvement in terms of formality and consistency.

It is recommended to establish clear admission criteria available in the form of an official document, also in English language (e.g. point could be given on the basis of evaluation of the interviews, applicants' project proposals and scientific record).

3.7. IMPROVEMENTS ARE NECESSARY

The Faculty of Graphic Arts has an Ordinance with terms and conditions of the call for applications, and the Committee that establishes whether the applicants meet the stipulated requirements. Results of selection procedure and the list of admitted applicants are public. After the selection of candidates under the terms of the competition, rejected applicants have the right to complain in accordance with legal conditions.

However, there is no transparent complaint procedure. The whole procedure including selection of candidates, the review the strengths and weaknesses of their application and receiving guidelines to improve research plans, fails as there is small number of candidates per year and the Faculty of Graphic Arts accepts every applicant. There is even anonymous complaint from PhD student that everyone who pays can enrol.

3.8. IMPROVEMENTS ARE NECESSARY

In Self-Evaluation Report it is stated that the recognition of candidates' prior learning and achievements relevant for the doctoral programme is defined by amendments to the Ordinance from April 2016, though no clear procedure about recognition of publications, non-formal and informal learning was presented to the Expert Panel.

The procedure is launched upon applicant's request, and is based on procedures for national students as everything is stated in Croatian language.

3.9. IMPROVEMENTS ARE NECESSARY

Except the statement on obligations of students and supervisors in the University ordinance and Faculty Ordinance, there is no clear definition or the contract between all three stakeholders: Faculty of Graphic Arts, supervisor(s) and PhD student, where clear rights and obligations are stated and understood. In both Ordinances main focus is on student obligations and less on supervisor's obligations and student rights. The contract that PhD students sign with the Faculty of Graphic Arts relates to the financial obligations only.

There is no clear mechanism on conflict management between all three stakeholders. As some of the PhD students have issues with their supervisors, it is strongly recommended to have a mechanism that provides protection of students in the conflict situation, as well as supervisors and faculty. This mechanism should ensure a high level of institutional as well as supervisory support to the PhD students. The mechanism could be a sort of agreement or advisory board that describes students' rights and obligations in detail, or any other tool that would offer support to PhD students of the Faculty of Graphic Arts, and inform them on their rights and obligations and protection upon admission.

An anonymous survey could be introduced, released among PhD students and supervisors allowing them to evaluate their progress/supervision with honesty and create a legal path (or appointed persons) to appeal to a higher authority in case of problems.

3.10. IMPROVEMENTS ARE NECESSARY

The Faculty of Graphic Arts states that after the selection of the PhD student for doctoral studies, during the motivational interview, institutional support mechanisms for students' successful progression are explained. Such procedure and support explained in detail to prospective candidates was not obvious from interviews with students during the site visit, neither was it clearly identified within the Self-Evaluation Report or by the Faculty of Graphic Arts management. The Faculty of Graphic Arts seems to offer institutional support to the PhD students in their research and career development, though it seems that is not the same for all PhD students and mostly depends on the supervisor. The support mechanisms are not elaborated in detail.

4. PROGRAMME AND OUTCOMES

4.1. IMPROVEMENTS ARE NECESSARY

In the Self-Evaluation Report, the Faculty of Graphic Arts states that teaching part of doctoral study programme accounts for about 20%. From the description of study programme is evident, that PhD students must obtain 40 ECTS credits from compulsory teaching courses, which accounts over 20% of the programme, and is over the recommended 20% by CroQF. The number of optional courses is 55, which is quite a high number. Courses have different credits, from 4 to 7, which presents danger that overall teaching load can be very high if PhD students choose courses with low number of credits. There is no evidence that students start with research work in the first year of enrolment. There is a need to reform the study programme so that it ensures at least 3 years of research-based content.

The doctoral study programme is in most respects improving the quality compared with the evidence presented from a previous evaluation of institution. One of such improvements is the obligation for PhD student to publish research results. PhD student is obligated to have at least one publication in journal cited in tertiary publications before the defence of the thesis, and orally present at least one paper at international conference. There is, however, considerable scope for enhancement of some areas that would ensure that international comparability is achieved. This is exemplified by features that have been identified in this report, such as the level of publications and project leadership of certain supervisors. While there is some interdisciplinarity, the area offers scope to extend this in the doctoral study programme, providing the PhD student with more than one supervisor for example.

4.2. IMPROVEMENTS ARE NECESSARY

Information package of doctoral studies available on website includes description of course objectives, intended outcomes, content, teaching and learning methods for each individual course. Every course has defined tasks, which describe the knowledge and skills PhD student should acquire. From description of intended learning outcomes it is evident that they are aligned with the level 8.2 of the CroQF.

The competences in research ethics are addressed with public available document The Code of Ethics of the University of Zagreb. Supervisors works with the PhD students on research skills, but also on issues related to ethical practice in scientific research.

From presented theses it is evident that PhD students obtained specific research competences, competences in research methodologies, reading and writing skills. They obtained knowledge, cognitive and practical skills, which is in accordance with level 8.2 of the CroQF. Two PhD students also showed very good skills of project planning.

It was also evident that presented doctoral theses are not on the same quality level. The Faculty Commission for doctoral studies should monitor the competences and work of supervisor and set some example of good supervision which would lead to high quality of theses.

Research for doctoral theses should be oriented into socially useful research results that would have a social impact.

4.3. IMPROVEMENTS ARE NECESSARY

The doctoral study program at the Faculty of Graphic Arts has no defined learning outcomes for its programme. Learning outcomes are defined at individual courses. With no specified learning outcomes, the connection with teaching and research contents cannot be made.

4.4. IMPROVEMENTS ARE NECESSARY

In spite of the absence of rigorously specified learning outcomes, there is evidence from review of doctoral theses and publications that PhD students receive an experience of reasonable quality and acquire some relevant competences.

However, since doctoral theses are on different levels and only few publications were published in high-impact journals, it is evident that learning outcomes and competences for level 8.2 of the CroQF are not met in every case. The cases of good practice (high level of thesis, publications in CC, SCI journals) should be presented to all teachers and PhD students, and followed.

4.5. IMPROVEMENTS ARE NECESSARY

Teaching is done through consultative courses. This can help PhD student to develop individual research skills. The Faculty of Graphic Arts presented this in form of publications of some PhD students, done in collaboration with their teachers. This is good example, but it seems that this is more an exception than common practice. The Faculty of Graphic Arts asserts with some confidence that formal teaching methods and training for skills in laboratory practice are of reasonable quality. However, some training, described as courses, appear to be delivered individually by supervisors according to their own methods and it is not clear that there is rigorous quality control of this process.

4.6. IMPROVEMENTS ARE NECESSARY

In the Self-Evaluation Report, the Faculty of Graphic Arts stated that some PhD students obtained general skills. The Faculty was organiser of COST training school and some PhD students attended workshops offered by other institutions.

Courses that aim to provide some generic transferable skills are offered, but require expansion and diversification. It is not clear how PhD students are informed about workshops organised at the University level, or offered by other institutions.

PhD students do not gain any ECTS credits for participating in seminars and workshops, which should be reconsidered.

4.7. IMPROVEMENTS ARE NECESSARY

It is not clear that there is a high level of flexibility towards providing instruction tailored to individual needs. There is scope to introduce wider diversity aligned with individual research plans.

A PhD student writes individual annual research plan together with the supervisor (Form PhD04). Upon inspecting the documents at site visit, the Expert panel found a high diversity in content. Most of the research plans were deficiently prepared, below expectations. Preparation of individual annual research plan for PhD student is very important issue and the Faculty of Graphic Arts should give more emphasis on it.

4.8. IMPROVEMENTS ARE NECESSARY

The Faculty of Graphic Arts has provided data of it's international connections in the Self-Evaluation Report. Research staff mobility is provided through Erasmus+, Ceepus and Basileus cooperation agreements with the European scientific institutions. The internationalization of the programme is ensured with courses carried out by three foreign lecturers, and one foreign citizen was enrolled in the doctoral study programme. Two doctoral theses were written in a foreign language.

The Office for International Cooperation of the Faculty of Graphic Arts provides information and encourages PhD students' mobility, though it is not clear how information is passed to PhD students. PhD

students are encouraged to participate in international conferences and they obtain 15 ECTS credits for scientific paper orally presented at an international conference. The Faculty of Graphic Arts covers admission fees to several international conferences relevant to the area of graphic technology and design. Some PhD students are actively involved in international projects (bilateral, COST). There is evidence of international cooperation of some teachers but further development is desirable. There is less internationalisation of PhD student activity, influenced also by financial constraints. This needs to be addressed as a strategic development as a priority.