Assessment report
Limited Framework Programme Assessment

Bachelor Business & IT

University of Twente

Contents of the report

1. Executive summary

In this executive summary, the panel presents the main considerations which led to the assessment of the quality of the Bachelor Business & IT programme of University of Twente, which has been assessed according to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, as published on 20 December 2016 (Staatscourant nr. 69458).

The panel considers the objectives of the programme to be sound and relevant and welcomes their interdisciplinary nature. The panel noted representatives of both Faculties involved in the programme, programme management, lecturers and students to share the vision underlying these objectives. The objectives lie within the 2010 ACM/AIS Information Systems Model Curriculum, matching the international requirements for the information science domain. The profile of the programme within this framework is clear.

The intended learning outcomes of the programme meet the objectives and reflect the interdisciplinary character of the programme, addressing the computer science and business administration domains and the interaction between these two domains. The intended learning outcomes conform to the bachelor level, as exemplified by the Meijers criteria and are clearly distinct from those of the Master programme in this domain.

The panel appreciates the programme objectives to educate students to continue their studies at master level in this domain, some students entering the labour market. In the panel's view, programme management maintains close relations with the professional field to adjust the programme to trends in this field.

The panel considers the programme to be managed conscientiously and welcomes the commitment of the Faculty of Electrical Engineering, Mathematics and Computer Science and the Faculty of Behavioural, Management and Social Sciences, as this constitutes an important factor to ensure the interdisciplinary nature of the programme.

The panel supports programme management's intentions to raise the number of incoming students.

The curriculum of the programme meets the intended learning outcomes. The panel considers the curriculum to be very adequate, addressing the computer science, business and management and information science domains. Research skills and academic and professional skills are appropriately included. The coherence is ensured through the learning lines in the curriculum and within the modules which are organised around themes and lead to integrating projects. The panel recommends to present some concepts and theories more pronounced, for students to better understand these.

The panel is positive about the lecturers in the programme, they being strong researchers and experts in their fields. The panel advises to strengthen the research efforts in information science within the Faculty of Electrical Engineering, Mathematics and Computer Science. The lecturers are considered by the panel to be qualified for lecturing, though the proportion of UTQ-certified lecturers is relatively modest. The reasons for this being the number of newly recruited lectures, the panel however advises to monitor this figure. The panel welcomes lecturers of both Faculties lecturing and working together in the modules.

The admission requirements and procedures of the programme are appropriate. The panel greets the additional efforts in mathematics and computer programming to allow students to adjust to programme requirements. The programme exemptions policy and regulations are adequate and clearly documented.

Appreciating the TEM-related educational concept, the panel is positive about the study methods adopted in the programme. The panel regards the number of hours of face-to-face education and the study guidance to be adequate. The panel advises to increase the study load, encouraging students to spend a minimum of 40 hours per week on their studies. The student-to-staff ratio is satisfactory. The student success rates could be further raised.

The programme examination and assessment policies as well as the formal position and authority of the Examination Board and the BIT Examination subcommittee are up to standard. The panel welcomes the pro-active attitude of these examination bodies.

The range of examination methods is appropriate, these methods meeting the course goals and course contents. The measures taken to ensure the validity of examinations and the reliability of assessments are adequate, to be deduced from examiners, being required to be UTQ-certified, from all examinations being peer-reviewed and from test matrices being used for all courses.

The process design and assessment of both the BIT Inc. Project and the Bachelor Research Project are adequate. The assessments involve two examiners and the use of scoring forms with relevant criteria.

The panel regards the grading across the Bachelor Research Projects somewhat dispersed, the grades not always precisely reflecting the underlying accomplishments by the students. Therefore, the panel recommends to intensify the carrousel meetings to discuss and calibrate Bachelor Research Projects' assessments and grades, the carrousels themselves being greeted by the panel.

The panel assesses the course examinations to be challenging. None of the Bachelor Research Projects reviewed were assessed by the panel to be unsatisfactory. The grades of these projects were generally found to be consistent with the grades the panel would have given. The subjects of some of the projects bordered the programme domain. Taking into account the relatively small study load of the Bachelor Project, the panel considers the students' accomplishments to be up to standard. Some of the students achieved good or very good results.

In the panel's opinion, the programme succeeds in preparing the programme's graduates especially for master programmes in this domain and some students for positions in the professional field.

The panel which conducted the assessment of the Bachelor Business & IT programme of University of Twente assesses this programme to meet the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, judging the programme to be good. Therefore, the panel recommends NVAO to accredit this programme.

Rotterdam, 9 April 2018

Prof. dr. ir. M.F.W.H.A. Janssen   drs. W. Vercouteren
(panel chair)   (panel secretary)

2. Assessment process

The evaluation agency Certiked VBI received the request by University of Twente to manage the limited framework programme assessment process for the Bachelor Business & IT programme of this University. This objective of the programme assessment process was to assess whether the programme would conform to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, published on 20 December 2016 (Staatscourant nr. 69458).

Management of the programmes in the assessment cluster Information Sciences convened to discuss the composition of the assessment panel and to draft the list of candidates.

Having conferred with management of the University of Twente programme, Certiked invited candidate panel members to sit on the assessment panel. The panel members agreed to do so. The panel composition was as follows:
- Prof. dr. ir. M.F.W.H.A. Janssen, full professor ICT and Governance, head of Information and Communication Technology research group, Faculty Technology, Policy and Management, Delft University of Technology (panel chair);
- Prof. dr. G. Poels, full professor Management Information Systems, director Business Informatics research unit, Department of Business Informatics and Operations Management, Ghent University (panel member);
- Prof. dr. U. Frank, full professor of Information Systems and Enterprise Modelling, Institute of Computer Science and Business Information Systems, University of Duisburg-Essen (panel member);
- E.E.M. Leo BSc, student Master Educational Sciences, University of Amsterdam, (student member).

On behalf of Certiked, drs. W. Vercouteren served as the process coordinator and secretary in the assessment process.

All panel members and the secretary confirmed in writing being impartial with regard to the programme to be assessed and observing the rules of confidentiality. Having obtained the authorisation by the University, Certiked requested the approval of NVAO of the proposed panel to conduct the assessment. NVAO have given their approval.

To prepare the assessment process, the process coordinator convened with management of the programme to discuss the outline of the self-assessment report, the subjects to be addressed in this report and the site visit schedule. In addition, the planning of the activities in preparation of the site visit were discussed. In the course of the process preparing for the site visit, programme management and the Certiked process coordinator regularly had contact to fine-tune the process. The activities prior to the site visit have been performed as planned. Programme management approved of the site visit schedule.

Well in advance of the site visit date, programme management sent the list of final projects of graduates of the programme of the most recent years. Acting on behalf of the assessment panel, the process coordinator selected 15 final projects. The grade distribution in the selection was ensured to conform to the grade distribution in the list, sent by programme management. Additional criteria have been taken into account, if these had been found to be relevant for the programme.

The panel chair and the panel members were sent the self-assessment report of the programme, including appendices. In the self-assessment report, the student chapter was included. In addition, the expert panel members were forwarded a number of final projects of the programme graduates, these final projects being part of the selection made by the process coordinator.

A number of weeks before the site visit date, the assessment panel chair and the process coordinator met to discuss the self-assessment report provided by programme management, the procedures regarding the assessment process and the site visit schedule. In this meeting, the profile of panel chairs of NVAO was discussed as well. The panel chair was informed about the competencies, listed in the profile. Documents pertaining to a number of these competencies were presented to the panel chair. The meeting between the panel chair and the process coordinator served as the briefing for panel chairs, as meant in the NVAO profile of panel chairs.

Prior to the date of the site visit, all panel members sent in their preliminary findings, based on the self-assessment report and the final projects studied, and a number of questions to be put to the programme representatives on the day of the site visit. The panel secretary summarised this information, compiling a list of questions, which served as a starting point for the discussions with the programme representatives during the site visit.

Shortly before the site visit date, the complete panel met to go over the preliminary findings concerning the quality of the programme. During this preliminary meeting, the preliminary findings of the panel members, including those about the final projects were discussed. The procedures to be adopted during the site visit, including the questions to be put to the programme representatives on the basis of the list compiled, were discussed as well.

On 1 December 2017, the panel conducted a site visit on the University of Twente campus. The site visit schedule was in accordance with the schedule as planned. In a number of separate sessions, panel members were given the opportunity to meet with Faculty Boards representatives, programme management, Examination Board representatives, lecturers and final projects examiners, students and alumni and professional field representatives.

In a closed session at the end of the site visit, the panel considered every one of the findings, weighed the considerations and arrived at conclusions with regard to the quality of the programme. At the end of the site visit, the panel chair presented a broad outline of the considerations and conclusions to programme representatives.

Clearly separated from the process of the programme assessment, the assessment panel members and programme representatives met to conduct the development dialogue, with the objective to discuss future developments of the programme.

Due to personal circumstances, the student member of the panel could not attend the site visit nor could she be present during the preliminary meeting of the panel. Having been informed about the absence of the student member, programme management agreed to proceed with the site visit as planned. The panel chair and the panel members also were in agreement to go on with the site visit. At the completion of the assessment process, the panel agreed this process to have been conducted in a sound way.

The assessment draft report was finalised by the secretary, having taken into account the findings and considerations of the panel. The draft report was sent to the panel members, who studied it and made a number of changes. Thereupon, the secretary edited the final report. This report was presented to programme management to be corrected for factual inaccuracies. Programme management were given two weeks to respond. Having been corrected for these factual inaccuracies, the Certiked bureau sent the report to the University Board to accompany their request for re-accreditation of this programme.

3. Programme administrative information

Name programme in CROHO: B Business & IT
Orientation, level programme: Academic Bachelor
Grade: BSc
Number of credits: 180 EC
Specialisations: not applicable
Location: Enschede
Mode of study: Full-time (language of instruction: English)
Registration in CROHO: 56066

Name of institution: University of Twente
Status of institution: Government-funded University
Institution's quality assurance: Approved

4. Findings, considerations and assessments per standard

4.1 Standard 1: Intended learning outcomes

> The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings
The objectives of this Bachelor programme are to educate students to become professionals at the academic level, being able to develop innovative IT-based solutions to solve business problems by adopting systematic and scientific approaches, to do so working in multidisciplinary teams and to take the social and temporal dimensions of this work into account.

Programme management showed the programme objectives to meet the domain-specific framework of reference, being the international 2010 Curriculum Guidelines for Undergraduate Degree Programmes in Information Systems of ACM/AIS. The programme is especially focussed on a number of competencies mentioned in these Curriculum Guidelines, such as identifying and designing opportunities for IT-enabled organisational improvement and designing and implementing information systems solutions.

Programme management translated the objectives into a series of intended learning outcomes, specifying, among others, business domain knowledge and skills, computer science knowledge and skills, business – information technology alignment knowledge and skills, research skills, professional skills, such as communication and collaboration skills and abilities to analyse and discuss ethical, social, cultural and societal dimensions of problems and solutions.

Programme management presented a table to show the intended learning outcomes to correspond to the Meijers criteria for bachelor level programmes.

The application domain for this programme has not been specifically delineated. Different domains are addressed. Some domains are more pronounced, as these industries are more strongly represented in the region. Examples are smart industries and logistics.

Students are predominantly educated to continue their studies at master level. Some 10 % of the graduates enter the labour market.

The BIT Advisory Board, composed of industry representatives, meets twice per year with programme management to discuss the trends in the industry and the relevance of the programme as seen from that perspective. The Board was installed in 1996.

Considerations
The panel considers the objectives of the programme to be sound and relevant and especially welcomes the interdisciplinary nature of the objectives. Students are clearly trained to in both the computer science and the business administration domains. The panel noted representatives of both Faculties, programme management, lecturers and students to share the vision underlying these objectives.

The programme objectives definitely have a place within the 2010 ACM/AIS Information Systems Model Curriculum and therefore match the international requirements for the information science domain. The panel is positive about the clear profile of the programme within this framework.

The objectives of the programme have been well translated into the programme intended learning outcomes. The intended learning outcomes reflect the interdisciplinary character of the programme, addressing the computer science and business administration domains and the interaction between these two domains.

The intended learning outcomes conform to the bachelor level, as exemplified by the Meijers criteria. In this respect the intended learning outcomes are clearly distinct from those of the Master programme in this domain.

The panel appreciates the programme objectives to educate students to continue their studies at master level in this domain, some students entering the labour market. In the panel's view, programme management maintains close relations with the professional field to adjust the programme to trends in this field.

Assessment of this standard
These considerations have led the assessment panel to assess standard 1, Intended learning outcomes, to be good.

4.2 Standard 2: Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings
The Bachelor Business & IT in a formal sense is a programme of the Faculty of Electrical Engineering, Mathematics and Computer Science of University of Twente. In the material sense, the programme is fully supported by both this Faculty and the Faculty of Behavioural, Management and Social Sciences. The director of the programme in collaboration with the programme coordinator supervises the quality and the programme contents on a day-to-day basis. The Programme Committee, consisting of students and lecturers, evaluates the programme quality and advises programme management in this respect. The BIT Examination subcommittee of the Faculty-wide Examination Board is responsible for monitoring the examination processes and the examinations and assessments of this programme.

The number of incoming students in the programme was about 35 to 40 students per year in the years 2013 to 2015 and rose to about 50 students in 2016, when the programme became international and English-taught. Programme management has set the target number of incoming students at 70 students, with about 40 % foreign students. Graduates of the programme are in high demand on the labour market.

Programme management presented a table to demonstrate the curriculum meeting the intended learning outcomes of the programme. Being organised along the lines of the Twente Educational Model (TEM), the curriculum consists of twelve self-contained modules of 15 EC each. Each of the modules is organised around a specific theme and is at the end completed by an integrating project. Courses within the modules contribute to the theme. Some modules are shared with the Bachelor Technical Computer Science programme, while others are jointly taken with Bachelor Industrial Engineering and Management or International Business Administration programmes students. Learning lines are woven through the modules. Learning lines are the mathematics learning line (mathematics shared with other Bachelor programmes), business line (subjects related to business and business innovation), computer science line (computer science or information technology subjects), information systems line (information systems subjects), research methodology line (to plan and do research, design science research touched upon) and academic skills line (academic and professional skills). In the third and last year, students may select the minor of their choice (30 EC). In the eleventh module, the so-called BIT Inc. Project is scheduled, being a real-life group project by five to six students. Students complete the curriculum with the Bachelor Research Project, scheduled in the last or twelfth module. This is an individual, research-oriented project. Most projects are done in companies.

Students may propose an individually designed curriculum, which the BIT Examination subcommittee has to approve. An honours programme is offered for talented students, which includes additional courses. The programme is English-taught, attracting about 20 % foreign students (figure for 2016 cohort). Students may spend part of the curriculum abroad or may participate in the international study tour, offered every two years. In the academic skills line, intercultural subjects are addressed.

Lecturers of both Faculties are involved in each of the modules. About 90 % of the lecturers have PhD's and are active researchers in the fields they teach in the programme. Both the Computer Science and Business Administration research groups have strong research track records. About 54 % of the lecturers are UTQ-certified (UTQ means University Teaching Qualification) or have been exempt. About 20 % of the lecturers have started the UTQ-course. Lecturers meet regularly to discuss the programme. Students are content about the lecturers, experiencing them as easily approachable. Company representatives give guest lectures.

The admission requirements for students are the secondary school diploma (vwo) and sufficient levels of English and mathematics in their education. Foreign students have to report equivalent levels of knowledge. Students who do not meet these requirements, may take preparatory courses. Students are invited to fill out the study choice questionnaire and to attend the so-called matching days during which they are informed about the contents and the organisation of the programme. Matching days are meant for students to take a well-considered choice to enrol in this or other programmes. In the first module of the curriculum, students are given the opportunity to change to other bachelor programmes. The mathematics line will be redesigned and additional computer programming courses will be offered to allow students to better adjust to the programme requirements.

Students may apply for exemptions. Requests for exemptions are handled by the BIT Examination subcommittee.

The programme educational concept is largely determined by TEM. Students are offered combinations of study methods, working towards the integrating projects at the end of the modules. Study methods adopted are lectures, tutorials, practical exercises, assignments, self-study activities and projects. In some cases, students give presentations. The number of hours of face-to face education are 20 hours per week in the first year, 14 hours per week in the second year, and a limited number of hours in the second part of the third year. Students may turn to the programme coordinator for support and advice regarding the programme. Study advisors counsel students on study choices, study planning and progress. The first year of the curriculum is strict, ensuring students not really suitable for the programme, to leave early. Students consider the programme to be feasible, studying about 30 hours per week. The student-to-staff ratio is 23 : 1. The student success rates are 35 % for students completing the programme after three years and 72 % for students finishing after four years (average figures for students registering in the second year, cohorts 2012 and 2013). The effect of the introduction in 2013 of TEM is not yet clear.

Considerations
The panel considers the programme to be managed conscientiously. The panel is very positive about the commitment of both Faculties, as this constitutes an important factor to ensure the interdisciplinary nature of the programme.

The panel supports programme management's intentions to raise the number of incoming students.

The curriculum of the programme complies with the intended learning outcomes. The panel considers the curriculum to be well-structured, addressing the computer science, business and management and information science domains. In addition, research skills and academic and professional skills are appropriately included in the curriculum. The coherence is ensured through the learning lines in the curriculum and within the modules which are organised around themes and lead to integrating projects. The panel recommends to present some concepts and theories more pronounced, for students to better understand these.

The panel is positive about the lecturers in the programme, they being strong researchers and experts in their fields. The panel advises to strengthen the research efforts in information science within the Faculty of Electrical Engineering, Mathematics and Computer Science. The lecturers are considered by the panel to be qualified for lecturing, though the proportion of UTQ-certified lecturers is relatively modest. The reasons for this being the number of newly recruited lectures, the panel however advises to monitor this figure. The panel welcomes lecturers of both Faculties lecturing and working together in the modules and is positive about the regular meetings of lecturers to discuss the programme.

The admission requirements and procedures of the programme are appropriate, as prior knowledge in terms of contents and proficiency in English are adequately checked. The panel greets the additional efforts in mathematics and computer programming to allow students to adjust to the programme requirements.

The programme exemptions policy and regulations are regarded by the panel to be up to standard and clearly documented.

Appreciating the TEM-related educational concept, the panel is positive about the study methods adopted in the programme. The panel regards the number of hours of face-to-face education and the study guidance in the programme to be adequate. The panel advises to increase the study load, encouraging students to spend at least 40 hours per week on their studies. The student-to-staff ratio is satisfactory. The student success rates could be further raised.

Assessment of this standard
These considerations have led the assessment panel to assess standard 2, Teaching-learning environment, to be good.

4.3 Standard 3: Student assessment

The programme has an adequate system of student assessment in place.

Findings
The examination and assessment regulations for the programme are in line with the University of Twente Assessment Framework. For all programmes of the Faculty of Electrical Engineering, Mathematics and Computer Science, one Examination Board has been installed, having the authority to ensure and monitor the quality of examinations and assessments and the corresponding processes of these programmes. The general subcommittee of this Board discusses, among others, the examination rules with the Dean. The so-called BIT Examination subcommittee of this Board has been given the authority for monitoring the quality of examinations and assessments for this Bachelor Business & IT programme and for the Master Business Information Technology programme. In this subcommittee, the two Faculties participating in the programme, are represented on an equal footing.

The course examination methods include written examinations with multiple-choice questions or with open questions or with the combination of both, presentations, assignments and projects.

For all courses, the examinations are peer-reviewed and are accompanied by test matrices, relating the examinations to the course goals. Examiners are appointed by the Examination Board, being required to be UTQ-certified. In case the examiner would not have the UTQ-certificate of be exempt, he or she is assisted by a UTQ-certified examiner. Fraud and plagiarism procedures for the programme are in place and cases detected are handled by the BIT Examination Subcommittee. The effect of free-riding in group projects is countered by having at least 50 % of the grade being awarded on the basis of individual results of students.

The last two projects in the programme are considered especially important for the level achieved by the students. The BIT Inc. group project in the eleventh module is graded by two examiners, the company representatives giving advice on the grade. The Bachelor Research Project in the last module consists of two parts, the first part being the literature review and problem statement and the second part being the final product. Student may select topics offered by lecturers. The Research Project is assessed by two examiners, the supervisor and the second reader, being the chair of one of the tracks to which the project relates. Industry representatives may give advice. The examiners make use of a scoring form with assessment elements, such as research question, literature review, theoretical framework, research method, research design, data collection, conclusions and writing structure. The oral presentation and defence are part of the project. Examiners are asked to grade these elements and are also asked to explain their grades on the scoring form. The presentation and defence may upgrade or downgrade the written product.

Programme management has scheduled so-called carrousels, being meetings of examiners meant to discuss and calibrate Bachelor Research Projects' assessments and grades.

Considerations
The panel considers the examination and assessment policies for the programme to be up to standard. The formal position and the authority of the Examination Board and the BIT Examination subcommittee are appropriate. The panel especially welcomes the pro-active attitude of these examination bodies.

The range of examination methods is appropriate, these methods meeting the course goals and course contents.

The measures taken by programme management to ensure the validity of examinations and the reliability of assessments are adequate, to be deduced from examiners, being required to be UTQ-certified, from all examinations being peer-reviewed and from test matrices being used for all courses.

The process design and the assessment of both the BIT Inc. Project and the Bachelor Research Project are adequate. The projects are appropriately organised. The assessments are up to standard as well, involving two examiners and the usage of the scoring forms with relevant assessment criteria.

The panel regards the grading across the Bachelor Research Projects somewhat dispersed, the grades not always precisely reflecting the underlying accomplishments by the students. Therefore, the panel recommends to intensify the carrousel meetings to discuss and calibrate Bachelor Research Projects' assessments and grades, the carrousels themselves being greeted by the panel.

Assessment of this standard
The considerations have led the assessment panel to assess standard 3, Student assessment, to be satisfactory.

4.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings
The panel studied the examinations of a number of courses of the programme.

The panel reviewed a total number of fifteen Bachelor Research Projects or theses of graduates of the programme, the theses exhibiting a variety of grades, ranging from satisfactory to very good.

Nearly 90 % of the graduates of the programme continue their studies at master level. About 10 % of the graduates enter the labour market, either as employees or to be self-employed. Programme graduates are admitted to University of Twente master programmes, such as Master Business Information Technology, Computer Science, Human Media Interaction or Business Administration. The majority of the students (about 75 %) enrol in the Master Business Information Technology programme.

Considerations
Having studied the examinations of a number of courses of the programme, the panel assesses these examinations to be very much up to standard and to be challenging.

None of the Bachelor Research Projects reviewed were assessed by the panel to be unsatisfactory. The grades of these projects were generally found to be consistent with the grades the panel would have given. In some cases, the panel assessed grades to be slightly too high. The subjects of some of the projects bordered the programme domain. Taking into account the relatively small study load of the Bachelor Project, the panel considers the students' accomplishments to be up to standard. Some of the students achieved good or very good results.

In the panel's opinion, the programme succeeds in preparing the programme's graduates especially for master programmes in this domain and some students for positions in the professional field.

Assessment of this standard
The considerations have led the assessment panel to assess standard 4, Achieved learning outcomes, to be good.

5. Overview of assessments

Standard	Assessment
Standard 1. Intended learning outcomes	Good
Standard 2: Teaching-learning environment	Good
Standard 3: Student assessment	Satisfactory
Standard 4: Achieved learning outcomes	Good
Programme	Good

6. Recommendations

In this report, a number of recommendations by the panel have been listed. For the sake of clarity, these have been brought together below. These panel recommendations are the following.

- To present some concepts and theories more clearly in the curriculum, for students to better understand them.
- To monitor the proportion of UTQ-certified lecturers, as this number is relatively modest.
- To strengthen the research efforts in information science within the Faculty of Electrical Engineering, Mathematics and Computer Science.
- To increase the study load, encouraging students to spend at least 40 hours per week on their studies.
- To intensify the carrousel meetings to discuss and calibrate Bachelor Research Projects' assessments and grades, the carrousels themselves being greeted by the panel.