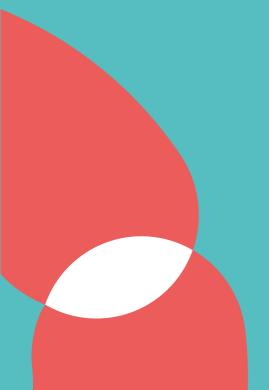# INITIAL ACCREDITATION INCLUDING THE DISTINCTIVE FEATURE 'SMALL-SCALE AND INTENSIVE EDUCATION'

HBO-BACHELOR
APPLIED DATA SCIENCE & ARTIFICIAL INTELLIGENCE
Breda University of Applied Sciences

Content

1   Peer review

The Accreditation Organisation of the Netherlands and Flanders (NVAO) determines the quality of a new programme on the basis of a peer review. This initial accreditation procedure is required when an institution wishes to award a recognised degree after the successful completion of a study programme.

The procedure for new programmes differs slightly from the approach to existing programmes that have already been accredited. Initial accreditation is in fact an ex ante assessment of a programme. Once accredited the new programme becomes subject to the regular review process.

The quality of a new programme is assessed by means of peer review. A panel of independent peers including a student reviews the plans during a site visit to the institution. A discussion amongst peer experts is the basis for the panel's final judgement and the advisory report. The agenda for the panel visit and the documents reviewed are available from the NVAO office, upon request.

The outcome of this peer review is based on the standards described and published in the extensive NVAO Assessment framework for the higher education accreditation system of the Netherlands (Stcrt. 2019, nr. 3198). Each standard is judged on a three-point scale: meets, does not meet or partially meets the standard. The panel will reach a conclusion about the quality of the programme, also on a three-point scale: positive, conditionally positive or negative.

Additionally, the panel assesses the distinctive feature 'Small-scale and intensive education'. This part of the review is based on the criteria described in the Specification of the criteria (Stcrt. 2018, nr. 17909). The panel scores each criterion on a two-point scale: meets or does not meet the standard. The panel's final conclusion is also on a two-point scale: positive or negative.

This report contains the findings, analysis and judgements of the panel resulting from the peer review. It also details the commendations as well as recommendations for follow-up actions. A summary report with the main outcomes of the peer review is also available.

NVAO takes its accreditation decision on the basis of a full report. The NVAO decision can be positive, conditionally positive or negative. Following a positive NVAO decision with or without conditions the institution can proceed to offer the new programme. NVAO also advises the minister of Education on granting the distinctive feature.

Both the full and summary reports of each peer review are published on NVAO's website www.nvao.net. There you can also find more information on NVAO and peer reviews of new programmes.

Because of COVID-19 temporary measures this peer review took place online

2 New programme

2.1 General data

Institution	:	Breda University of Applied Sciences
Programme	:	HBO-Bachelor Applied Data Science & Artificial Intelligence
Mode of study	:	full time
Degree	:	Bachelor of Science
Location	:	Breda
Study load	:	240 ECTS[1]
Field of study	:	Technology (Techniek)

2.2 Profile

Breda University of Applied Sciences (BUas) aims to turn hbo-bachelor Applied Data Science & Artificial Intelligence (ADS&AI) students into hands-on skilled professionals able to apply data and AI solutions in practice. Throughout the programme, students work with lecturers on projects with a wide range of realistic data-related matters. The bachelor offers so called 'international classrooms', where students approach problems from different cultural angles. In order to process data correctly, students learn the phases of the so-called CRISP-DM cycle[2]. This methodology consists of a series of steps that data professionals go through to develop a useful project or product. The programme focuses on topics such as programming, machine learning, deep learning, business intelligence and digital transformation, law and ethics. Students learn to work with Data Science and AI in different industrial sectors (domains)[3]. The bachelor programme therefore offers industry/domain specific knowledge that students need to design viable applications. The programme also helps students to develop a range of non-technical professional skills such as project management, collaboration, leadership, research skills and ethical awareness. The bachelor's programme ADS&AI will be part of the Academy for Games and Media (AGM).

2.3 Panel

Peer experts

1. Prof. Dr. Rob Koper (*chair*); University professor at the Open University, focusing on educational innovation educational sciences, ICT in education and data science;
2. Fiona Schrage MSc; Program manager Bachelor Creative Media & Game Technology. Project leader (TNO) Associate Degree Mechatronics in the Smart Industry and teacher of Professional Skills Engineering;
3. Drs. Frans van den Akker; Business developer at Industry BL Digital RHDHV. Program manager Digitalization TKI E&I, TKi Nieuw Gas and Liason officer NL AI Coalition. Member at research & innovation Nl AI coalition;
4. Kevin Voorn (*student)*; Studied at the HBO-ICT course of the Hanzehogeschool Groningen. He has experience in both central and decentralized employee participation.

Assisting staff

– Yvet Blom, secretary;
– Lotte Ninaber van Eijben, NVAO policy advisor and process coordinator.

Site visit (online)
15 December 2021

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[1] European Credits

[2] Crisp-DM stands for the CRoss Industry Standard Process for Data Mining

[3] Students will work on Data Science and AI in the following domains: Logistics, Built Environment, Media, Games, Leisure, Tourism, Hospitality and Facility Management.

3   Outcome

The NVAO panel reaches a conditionally positive conclusion about the quality of hbo-bachelor Applied Data Science and Artificial Intelligence offered by BUAS.

The hbo-bachelor ADS&AI is a four-year programme. During the programme, students work on real-life data related matters to learn how to apply data and AI solutions in practice. The profile for the ADS&AI was designed in close collaboration with the The Hague University of Applied Sciences (THUAS) and local professionals. Both these parties will continue to play an active role during the programme. The panel believes that the involvement of educational and professional partners is a positive thing. Other positive elements of the ADS&AI programme include the curriculum's structure, the realistic DataLabs, the digital learning environment and the enthusiastic team of lecturers.

The panel notes, however, that a number of matters need further clarification. The current research methods within the programme are too 'problem-solving' oriented. Research must be transferable to contexts outside of the university and is more than just solving problems. In order to bring the current research part of the programme up to par, Breda University of Applied Sciences (BUas) needs to provide a better methodological foundation for the research methods. Another concern is the amount of self-study hours. The theoretical foundation is reliant mainly on self-study. The panel fears that students may find it difficult to motivate themselves for self-study three days a week. The responsibility for developing the required level of knowledge should not lie primarily with the students. Buas should at least carry part of this responsibility by offering theory related work during contact hours. A third point of concern is the small teaching team. The current team is too vulnerable due to its size. Although Buas intends to recruit new staff, there is a chance that Buas will not be able to do so before the start of the programme. To ensure that Buas can achieves their ambitions, the programme must come up with a plan that describes what will happen if only part of the vacancies get filled in time.

With the hbo-bachelor's degree ADS&AI, Buas introduces a practical oriented programme that allows students to gain experience with real-life data related matters. However, on the points mentioned above, the programme requires a more detailed description. This leads to the following three conditions that must be adhered to before 1 June 2022:

Firstly, expand the research methods and approaches used during the programme to cover problem-solving as well as being able to transfer knowledge to contexts outside of the programme.

Secondly, offer a learning environment where students don't have to primarily rely on self-study to acquire the necessary knowledge and skills. The main responsibility should lie with BUas, not with the students.

Lastly, provide a realistic contingency plan that deals with the situation in which BUas is not able to recruit enough teaching staff before the start of the programme.

Standard	Judgement
1 Intended learning outcomes	meets the standard
2 Curriculum; orientation	partially meets the standard
3 Curriculum; content	meets the standard
4 Curriculum; learning environment	partially meets the standard
5 Intake	meets the standard
6 Staff	partially meets the standard
7 Facilities	meets the standard
8 Tutoring	meets the standard

9 Quality assurance	meets the standard
10 Student assessment	meets the standard
Conclusion	**conditionally positive**

The panel reaches a negative conclusion about the qualification for the distinctive feature 'Small-scale and intensive education'.

BUas wants to offer a state-of-the art programme that has a higher graduation rate than comparable programmes. Positive elements of the programme include the great number of extracurricular activities, the DataLabs and the digital learning environment.

However, the panel found that, at the time of the online site visit, BUas did not provide sufficient evidence to show that the ADS&AI programme achieves an above-average level. The panel has based this conclusion on the fact that the features described by BUas are not unique for an hbo-bachelor programme and that the programme and final level is no different than that of the ADS&AI programme of THUAS. THUAS and BUas designed the ADS&AI bachelor programme together, but THUAS has not applied for the distinctive feature "small scale and intensive education". Another point of concern is that the panel believes that the current team of lecturers is too vulnerable due to its small size. BUas wants to solve this issue by employing more lecturers before the start of the programme. However, the severe shortage of data professionals on the labour market can be an issue for recruiting lecturers. The panel advises BUas to think about what happens if they can only recruit part of the lecturers they need or none at all.

All in all, Breda University of Applied Sciences introduces an exciting hbo-bachelor programme with a stimulating learning environment. However, in order to achieve the distinctive feature of small-scale intensive education, BUas needs to proof that the university will indeed offer an above-average level programme. BUas also has to come up with a plan that describes what they will do if the required vacancies can't be filled, or only partially be filled. These shortcomings stand in the way of a positive decision. The panel therefore concluded that the hbo bachelor ADS&AI is not granted the distinctive feature of small scale and intensive education.

Criterion	Judgement
A Intended learning outcomes	does not meet the standard
B Curriculum: content	meets the standard
C Curriculum: learning environment	meets the standard
D Intake	meets the standard
E Staff	does not meet the standard
F Facilities	meets the standard
G Achieved Learning Outcomes	does not meet the standard
Conclusion	**negative**

4   Commendations

The programme is commended for the following features of good practice.

1. Strong partnerships – The programme was developed in collaboration with the THUAS and local professionals. Both partners are excited about the profile and continue to stay involved.

2. Coherent curriculum – The curriculum has a strong structure. The courses that students take become more and more complex as the programme progresses.

3. DataLabs – In the DataLabs students work on projects consisting of real-life data related cases.

4. Digital learning environment – The digital learning environment allows students to collaborate in the learning communities and on projects online. The learning environment enables lecturers to provide students with feedback and offer remote support.

5. Experienced team of lecturers – BUas has put together an enthusiastic, experienced and diverse team of lecturers.

5   Recommendations

For further improvement to the programme, the panel recommends a number of follow-up actions.

1. Lectors – Build a stronger connection with the research centre and its lectors and utilise the (research) skills and experience of the lectors better.

2. Mathematics – Analyse the mathematics component of the real-life cases and topics offered in the DataLabs and ensure that students learn the necessary mathematics skills for those topics.

3. Learning communities – Broaden the concept of the learning communities that is applied in the programme. The current set-up is purely focused on one-issue projects. A more general set-up of the learning communities creates a stronger learning and a better industrial focus of the programme

4. National AI Course – Use the National AI Course only as an informative tool for prospective students and not as a means to determine knowledge and skills.

5. Reduce reflection – Reduce the number of (self) reflection moments as they could end up being counterproductive.

6. Graduation rubric – Outline the self-assessment graduation rubrics in more detail as they are not transparent enough in terms of grading.

6   Assessment

6.1   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.

Judgement
Meets the standard.

Findings, analysis and considerations

The programme's main objective is to turn students into hands-on skilled professionals, digital transformation agents, who can implement data and AI solutions in a commercial context within different domains.

An expected shortage of data science professionals sparked the initiative for the development of the bachelor ADS&AI. The profile for the ADS&AI was designed in close collaboration with THUAS who also intends to offer an ADS&AI bachelor. The EDISON Data Science Framework forms the basis of the programme. BUas and THUAS both drafted their own ideal ADS&AI profile separately, including intended learning outcomes. Both universities then liaised with their networks in order to create a profile suitable to meet industry needs. After this process the individual profiles were merged and turned into a concept version of a national Applied Data Science & Artificial Intelligence profile. The learning outcomes attached to the profile were presented to the advisory board of both universities, industry experts and several applied sciences universities that want to start a similar programme.

The final profile consists of 11 intended learning outcomes that are of a very high standard. BUas has further defined the intended learning outcomes through behavioural indicators. To acquire the learning outcomes a high level of independence and responsibility is expected from students. There is focus on the importance of developing adaptive capacity for students, which is in line with the fast developments in the field of data science. The information file shows that students are given the responsibility to formulate their own intended learning outcomes in the graduation phase. During the conversation with the Board of Examiners it became clear that this is not the case. The learning outcomes are fixed outcomes and are equal for all students, but students are responsible for creating the content and activities to achieve those outcomes. The intended learning outcomes are linked to the Dublin descriptors and translated into specific learning objectives. The final bachelor level was established by comparing the intended learning outcomes with national and international standards for hbo-bachelor programmes[4]. The panel is pleased to know that the individual responsibility of students does not entail formulating intended learning outcomes. The panel believes that although not all relevant sectors are connected yet, the intended learning outcomes are well aligned with the regional professional field and THUAS. The panel is excited about the collaboration with local companies and THUAS and deems the intended final level ambitious, but in line with applicable standards.

The fact that BUas has actively involved its regional network to contribute to the programme is very positive. The representatives specified that there is a massive need for Data Science and AI professionals. With this new programme the aim is to attract both national as well as international students with all sorts of (technical and non-technical) backgrounds. Students who have the ambition to work with data and want to solve data related problems are welcome to join the programme. Industry representatives expect that, with the presented profile, ADS&AI graduates will be a different type of

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[4] The national standard for higher vocational education that BUas and THUAS have used is the hbo-bachelor standard of the Netherlands Association of Universities of Applied Sciences. The international standard concerns the Dublin descriptors.

data scientists with even stronger communication skills, who are prepared to solve data science, AI and digital transformation issues. The ADS&AI professional works on data-related (social) matters and has the skills to explain the use and processing of data to various stakeholders. It is therefore important that ADS&AI professionals have ethical knowledge regarding possible consequences of processing certain data. According to the representatives of the professional field, the experience with real-life cases will contribute greatly to the development of state-of-the-art knowledge and skills. Due to the knowledge and skills that students pick up, the representatives find it likely that lengthy training procedures once students start working are not necessary. The skills taught during the programme are believed to match the skills students need in their professional careers. Industry representatives will stay involved with the programme through the advisory board as well as through offering (graduation) assignments. The panel is confident about the relationship between BUas and the professional field. As the professional field has been actively involved in the realisation of the bachelor, there is a strong connection between the programme's profile and industry needs. The panel believes that sectors which are not represented yet will be added to the network and the Industry Advisory Board.

BUas' hbo-programme ADS&AI offers an aspiring set of learning outcomes. These allow students to become hands-on skilled and adaptive professionals who are able to implement data and AI solutions in a commercial context. The programme's profile has been drafted together with industry experts and lecturers from the university. The industry representatives are excited about the programme. The programme meets their need for data professionals with strong communication skills who take multidisciplinary aspects and stakeholders into account when implementing digital transformations. The panel concludes that the intended learning outcomes meet the standard of the programme and are in line with what the professional field needs. Based on the above, the panel decides that the criteria for this standard have been fulfilled.

6.2 Standaard 2: Curriculum; orientation

The curriculum enables the students to master appropriate (professional or academic) research and professional skills.

Judgement
Partially meets the standard.

Findings, analysis and considerations

Representatives of the professional field who spoke to the panel during the online site visit expect students to gain state-of-the-art knowledge and skills during the programme. This is based on the fact that students will work on real-life projects with the required level of challenges included. Students will work with lecturers on ADS&AI related knowledge and skills such as software engineering, user-experience design, data visualisation and software architecture. They will also learn how to manage projects and work in different settings[5]. Working in different settings allows students to adapt to new situations and constantly acquiring new skills. By managing new situations and having to acquire new skills, students will develop adaptive capacities. This is important because data science and AI technologies change rapidly and continually. Knowing how data is applied in different industries gives students the ability to work in different contexts and to easily adapt. Developing communication skills is another important aspect that students will learn when they work on projects. Specifically, communication within and between different disciplines including communication with non-data science experts. This gives students the tools they need to work in a multidisciplinary environment. Self-reflecting and feedback also form part of the curriculum.

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[5] Students will get to work in leisure, tourism, hospitality, facility management, logistics, built environment, media and games industries.

The information file outlines that research throughout the programme goes further than solely acquiring academic research skills such as drafting research questions, conducting desk research and writing conclusions. The panel wanted to know how the research skills in this curriculum are different from research skills of other universities. The development team explained that students will also develop Data Science and AI related research skills. For each project students will go through the different phases of the design and development process of Data Science and AI applications, using clear steps such as product analysis and prototyping. The panel learned that research throughout the bachelor programme focuses mainly on implementing digital solutions for society as a whole as well as companies. Improving currently used applications will be less dominant.

Each project has a research element and the panel believes that is the right way to go when developing research skills. However, it is not clear to the panel how BUas is going to meet international (applied) research standards. The panel deems the current research methods within the programme too 'problem solving' oriented. Research outcomes need to be generalised and transferrable to other situations, which includes more work than just solving problems. In order to get the current research part of the programme up to par, the panel sets a condition requiring a better methodological justification of the research methods.

Another topic the panel had questions about was the role of lectors within the bachelor. The programme management stated that lectors are involved via the research centre of the Academy for Game and Media. Management explained that lectors of the centre have agreed to make an active contribution to the guilds and projects. The representatives of the programme were not able to explain adequately to the panel what the role of the research centre and the lectors is going to be. The panel got the impression that the lectors could be utilised more strongly and more broadly which enables BUas to strengthen the research component. The panel therefore recommends to find a better connection with the research centre and its lectors.

The panel notes that the justification for the research methods and approaches needs to be more detailed. As a condition, the panel expects a full methodological justification for the way research skills will be acquired during the programme. The condition has to be met before the 1st of June 2022. Based on the above, the requirements for standard 2 have been partially met.

6.3 Standaard 3: Curriculum; content

The contents of the curriculum enable students to achieve the intended learning outcomes.

Judgement
Meets the standard.

Findings, analysis and considerations

The Bachelor ADS&AI is a 4-year English programme with a total study load of 240 European Credits (ECTS). Within the programme, a year is divided in four block periods of ten weeks. In the programme, students learn to work on real-life data-related matters in applied research labs (DataLabs). These DataLabs play a vital part in the programme. The programme uses the methodology of the CRISP-DM cycle[6]. Students work two days a week in DataLabs and three days a week on self-study. Over the course of the programme, students are given the opportunity to personalise their learning process. That

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[6] The Crisp-DM cycle has the following phases: Business Understanding, Data Understanding, Data Preparation, Modeling, Evaluation, and Deployment.

means that students get an individual learning route based on the desired career they want[7] within the industry[8] of their choice.

The panel is positive about the setup of the programme. The foundation is laid in the first year and the following three years add more and more depth. Every year has its own focus: Foundation (year 1), Exploration (year 2), Collaboration (year 3) and Personalisation (year 4). Year 1 kicks off with an introduction into AI development. Students will acquire knowledge about Python programming, machine learning, deep learning, business intelligence and digital transformation (including knowledge of legislation and ethics). In addition, students gain experience with topics such as design thinking, project management and oral and written communication. Year 2 focusses on experimenting with and expanding the knowledge and skills students acquired in year 1 and covers topics such as natural language processing, data engineering and in-depth programming skills. In the DataLabs, students, in teams, work on practical assignments and learn more about the role of Data Modellers/Scientists, Data/AI engineers and Data Consultants (Digital Transformation Specialists). While working on their assignments, students will gain experience with digital transformation processes and learn how to work and communicate with the client.

The main topic of year 3 is collaboration. In the first semester, students follow a specialisation by choosing a project in one of the above-mentioned domains. Throughout the specialisation, domain specific knowledge is offered to be able to design viable applications. The second semester of year 3 is completed through an internship. Year 4, the graduation phase, focuses on personalisation. During the graduation phase, students go through (parts of) the CRISP-DM cycle. Students must demonstrate that they know how to use and process sources, consider the wishes of various stakeholders and how to take legal and ethical aspects into account. Students are challenged to demonstrate they are independent, creative professionals. Students get the freedom to personalise their graduation year in order to be as well prepared for their career as possible. Ways to personalise year 4 are with an exchange programme, a premaster Strategic Business Management[9], the opportunity to start a business, a minor and following a second specialisation project within the ADS&AI programme. Students finalise their graduation year by delivering professional products, a research paper or a combination of both. The panel appreciates the setup of the programme that offers students the possibility to expand and personalise their learning route. The specialisations, internships, exchange programmes and minors reflect a student-centred approach.

During the discussion with the development team, the panel asked about the reason why BUas had chosen linear algebra to teach students mathematics. The development team indicated that the aim of mathematics in the programme is for students to understand data science tools. Students are supposed to use mathematics as a tool to see how things relate to each other and how to use algorithms. The development team emphasised that deep learning is a series of linear transformations. Therefore, linear algebra is appropriate. However, the panel believes that linear algebra is not suitable for a lot of AI and data science approaches. Most AI and Data Science approaches use discrete mathematics such as graph theory, number theory, etc. The panel advises to analyse the real-life cases and topics offered in the DataLabs on their mathematics component, and ensure that students learn the necessary type of mathematics for those topics. In addition, the panel proposes to offer mathematics during contact hours.

The panel is of the opinion that the curriculum is well set up and covers all of the intended learning outcomes. BUas offers students an individual learning route based on the career students aspire within the industry of their choice. The panel appreciates this student-centred approach. The panel notes that

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[7] Students can choose to fulfil the role of: Data Modeller/Scientist, Data/AI engineer, or Data Consultant (Digital Transformation Specialist).
[8] The BUas domains are: Logistics, Built Environment, Media, Games, Leisure, Tourism, Hospitality and Facility Management.

BUas has included relevant subjects throughout the bachelor. The panel advises analysing the math component of the assignments to ensure that students gain the necessary math skills and offer students extensive guidance in math during contact hours. The panel believes that the content of the programme is sufficient to achieve the intended learning outcomes and deems that standard 3 meets the requirements.

6.4 Standaard 4: Curriculum; learning environment

The structure of the curriculum encourages study and enables students to achieve the intended learning outcomes.

Judgement
Partially meets the standard.

Findings, analysis and considerations
BUas aims to encourage students to acquire skills necessary to become robust professionals. To help prepare students for rapidly changing working environments, BUas offers a learning environment in which students learn to keep expanding their knowledge and skills and use those in different situations. The learning environment BUas proposes includes so called 'work models' and a number of didactic principles. The work models consist of research and project management methodologies and software-, data- and AI-architectures. The methodologies and architectures are partially context independent and therefore useful to help students be adaptive to unknown situations. One of the didactic principles includes learning through flip-the-classroom. Flip-the-classroom is an educational model in which students do the preparation at home or on BUas premises without instructions during contact hours. Contact hours are more aimed at feedback and interaction.[9]

BUas uses the 'learning communities' teaching model. Learning communities are formed by bachelor and master students, alumni, lecturers and industry professionals. According to the programme management, the model aims to building ecosystems where students, lecturers and professionals form expert groups also known as guilds based on common interests. The guilds can either be related to an ongoing project or an extra-curricular activity. Examples could be guilds that organise conferences, or guilds where master students help first year students with their project work and assignments. The panel is positive about the learning communities' concept and appreciates the fact that students are encouraged to participate in extra-curricular activities. However, the panel believes that the learning community concept is a much wider concept. Learning communities normally consist of students, lecturers, researchers and professionals who form a community together in which participants set individual and collective goals and collaborate in projects. In the current set-up, the communities are purely focused on one-issue projects. A more general set-up of the learning communities would create a stronger learning climate according to the panel. The panel therefore proposes to implement a wider concept of the learning communities within the programme.

The core of the programme revolves around projects conducted in DataLabs in which students and lecturers work together on implementing Data and AI solutions. Students work two days a week in DataLabs. In the DataLabs, students will develop professional skills (including research skills) and domain specific knowledge through tutoring, coaching. Real-life data for fictional assignments are provided by (local) companies. Students have the option to work on assignments with different complexity, labelled bronze, silver, and gold. By achieving these challenges students can earn badges, to earn the excellent status. Students spend three days a week on self-study. Self-study days are for students to acquire knowledge and skills needed for the DataLabs by watching online instruction videos of (guest) lecturers or by participating in (online) workshops. Online instructions and workshops are

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[9] Other didactic principles are working on project-based real-life cases, creating designs that are people-oriented, taking responsibility for one's own development and raising awareness about ethical and legal aspects in developing responsible AI and data solutions.

received via the university's digital environment Github Classroom. Github Classroom also offers online learning materials such as exercises and quizzes. Self-study days are completed with a Q&A session with a lecturer via Microsoft Teams. Students receive regular feedback from lecturers and fellow students.

The panel is excited about the DataLabs. The DataLabs promote innovation, collaboration and co-creation and encourage students to reflect on their own development. The amount of self-study hours, however, is problematic. The theoretical foundation is based mainly on self-study. The panel fears that students might find it difficult to motivate themselves three days every week for self-study. To what extent can BUas guarantee the required level of comprehension through self-study alone? This responsibility should not lie with students. The panel sets a condition to offer students a learning environment for acquiring the necessary theoretical knowledge where students don't primarily rely on self-study. The panel asks BUas to submit a solid programme before 1 June 2022, in which they focus on providing students an approach that is less dependent on self-study to teach the necessary theoretical foundations.

In the DataLabs, students go through the entire CRISP-DM cycle in an agile way. Every project is set up in the same way. It starts with a 'project brief' which includes relevant information to get started, with both intended learning outcomes and frameworks. Based on the project brief and learning outcomes, students set block goals and personal goals. Students keep track of their progress in two separate logs: a work log and a learning log. The work log outlines the activities that the student undertakes, the learning log students' individual learning process. The learning log is a portfolio that students use to track their progress.

The working language of the programme is English. At the request of the panel, the programme management has, prior to the online site visit, clarified in a written explanation the reasons for this choice. BUas expects that many of the graduates will eventually work in or with international teams, in companies where the language of instruction will be English. In addition, BUas and the regional professional field want to attract international students in the hope that some of the international students will continue to live in the Netherlands. In this way, BUas and the professional field want to limit the enormous shortage on the labour market. Other reasons for the English language of the programme include the English literature, the international teaching team and international students.

The panel believes the DataLabs offer an inspiring learning environment that give students the opportunity to experience real-life data related (social) challenges. The project-based approach is student-centred and exciting. However, the panel deems the amount of self-study hours problematic. It does not seem appropriate for the average hbo-student to be responsible for laying their own theoretical knowledge foundation. The panel expects BUas to develop a programme that does not fully rely on self-study when it comes to acquiring theoretical knowledge. The panel requests the programme management to comply with the condition by 1 June 2022 at the latest. Based on the above, the panel determines that the requirements for standard 4 have been partially met.

6.5 Standaard 5: Intake

The curriculum ties in with the qualifications of the incoming students.

Judgement
Meets the standard.

Findings, analysis and considerations
The bachelor ADS&AI commences in September 2022 and the organisation expects to attract a maximum of 50 students in the first year. The long-term goal is to attract 100 students per year. By law, applicants for the bachelor are expected to either hold a Dutch havo or vwo diploma with Mathematics A or B (or equivalent) or an mbo level 4 diploma (or equivalent).

The intake procedure consists of a portfolio assessment and an interview. Students are assessed based on three aspects: motivation, suitability and skills. Skills are established based on students' English language abilities and AI and mathematics knowledge. In order to determine students' AI knowledge, students are asked to submit a certificate stating they partook in the National AI Course. The panel believes that the National AI Course is a good tool to determine what AI is, but is not suitable to establish the level of skills and knowledge of prospective students. The AI course is a generic AI course and aims to give general information about the basic principles of AI. It is not meant to assess whether someone has sufficient AI knowledge. The National AI course is also proven to be sensitive to fraud as it is not meant to be used as a test. The panel recommends using the National AI Course only as an informative tool for prospective students and not as a means to determine knowledge and skills.

The programme management thinks that the diverse educational background of potential students can lead to major differences in the knowledge and skill level of students. To ensure that students all have a minimum level of Mathematics, Programming and English, BUas has online deficiency programmes available for Mathematics (via Khan Academy course), basic programming in Python (Code Academy suggested courses) and English. Improving students' English language skills happens via tailor-made programmes to fit the needs of each individual student. To improve their mathematics skills, students are encouraged to follow courses at Khan Academy[10] supplemented by in-house mathematics workshops.

The panel is positive about the intake procedure and believes it is sufficient to filter out a potential lack of knowledge and skills prospective students might have. The online programmes BUas offers, enable students to fill the existing knowledge gaps. The panel considers this standard to be sufficient.

6.6 Standaard 6: Staff

The staff team is qualified for the realisation of the curriculum in terms of content and educational expertise. The team size is sufficient.

Judgement
Partially meets the standard.

Findings, analysis and considerations
During the online site visit, the panel spoke with a team of committed lecturers. The core team consists of five lecturers, with expert knowledge and a programme manager. In addition to the five core lecturers, specialists on specific topics from other programmes within BUas and external specialists form part of the teaching staff. The information file describes that BUas will hire an extra 3 FTE in April 2022. This has been confirmed by the programme management and teaching staff. In addition, management even stated that BUas aims for a 10:1 student-teacher ratio as opposed to the 20:1 ratio mentioned in the information file. The panel wonders how BUas is going to recruit lecturers in a labour market with a high demand for data professionals. The current shortage on the labour market makes it difficult to attract qualified lecturers. The programme management explained that BUas knows how to attract staff in a difficult labour market by expanding their focus to lecturers abroad. The four vacancies for the core team were filled quickly and BUas therefore expects that for the other vacancies they will receive many applicants. The programme management states that BUas offers an inspiring international community and assists new staff members with moving to the Netherlands by providing good relocation packages. BUas will also approach alumni to encourage them to apply, and use "hybrid lecturers" to provide a lecture whenever this is needed. Hybrid lecturers are TMC Data Science professionals who have availability in their working schedule to teach several hours a week. Another option would be to use the lecturers associated with the Bachelor's programme in Creative Media & Games Technologies.

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[10] Students are encouraged to follow the following courses: pre-calculus functions and equations, trigonometry, basic set theory and probability concepts and scalars and vectors.

According to programme management, it will not be a tremendous problem if BUas does not succeed in fulfilling vacancies since the current FTE's are sufficient for the first year of the programme.

Due to the shortage on the labour market, the question arises what happens if BUas can't find enough qualified staff before the programme starts. The teaching team has indicated they need an extra 3 FTE to be able to provide the required level of education. The panel agrees, since the small size of the current team of teachers will jeopardise the viability of the programme. Plus, it is essential to hire more lecturers to cover the programme's core topics. The panel deems it necessary that BUas comes up with a proper strategy for how they are going to recruit the required extra lecturers including a backup plan in case BUas does not succeed. The panel sets a condition for BUas to provide a realistic contingency plan in case they are not able to recruit enough lecturers before 1 June 2022.

The panel is positive about the enthusiasm and dedication of the lecturers. However, the team of lecturers is not complete as it is now. The panel sets a condition for recovery to provide a realistic contingency plan in case BUas is not able to recruit lecturers. These findings lead to the conclusion that the criteria for this standard have been partially met.

6.7   Standaard 7: Facilities

The accommodation and material facilities are sufficient for the realisation of the curriculum.

Judgement
Meets the standard.

Findings, analysis and considerations
The information file together with a video gave the panel a good impression on the BUas university building and the facilities that BUas offers. The panel was also given access to the Learning Management System (LMS) which gives students access to each BUas learning system. One of those systems is Github Classroom. Github is an online platform that allows students and lecturers to work together on projects and share knowledge. The Github platform is the main system that makes collaborative learning within the learning communities possible. It also makes it possible to provide students with feedback and offers the option of remote support to students during internships and exchange programmes. The panel is positive about the LMS and the choice for Github Classroom. Github CLassroom is suitable for the small-scale design of the programme. The panel also appreciates the setup of the campus and expects that the facilities will contribute to a pleasant and good learning environment.

The panel determines that the campus and facilities are sufficient for the realisation of the programme and considers standard 7 to be met.

6.8   Standaard 8: Tutoring

The tutoring of and provision of information to students are conducive to study progress and tie in with the needs of students.

Judgement
Meets the standard.

Findings, analysis and considerations
BUas puts in a great deal of effort into student support and it has not gone unnoticed. Lecturers are assigned to a year team of students and act as experts and mentors. They support students in these roles during DataLab projects. Each student team is further assigned a study career coach. These so-called career coaches (members of the core teaching team) support students during individual and group sessions with their study skills, study progress, career development and professional development.

During year 1, there is extra assistance available for the subjects mathematics, programming and English language proficiency. From the second year on, students will become more and more responsible for developing the necessary knowledge and skills. In year 4, during the graduation projects, students are supported by a personal supervisor.[11] Students keep track of their progress in a work and learning log. The panel expresses its appreciation for the way BUas plans to provide this thorough form of support throughout the entire programme, including the extra assistance for 'difficult' subjects where needed. The panel emphasises however, that it is important to attract ample lecturers (see standard 6) in order to make this possible.

The panel is positive about the way information is shared with students within the programme. The student handbook is well written, including annual and block procedures, requirements for assessments and necessary competencies students need to achieve. The project briefs students receive for each project provide a detailed description of the project goals, intended learning outcomes, additional requirements, deliverables[12] and timeline. Both the student manual as well as the project briefs are published on the LMS.

The panel believes that BUas has developed an adequate student support system. The programme offers small-scale education and has a sound method of providing students with the necessary information. The panel deems the requirements of this standard as met.

6.9   Standaard 9: Quality assurance

The programme has an explicit and widely supported quality assurance system in place. It promotes the quality culture and has a focus on development.

Judgement
Meets the standard.

Findings, analysis and considerations
The information file provided the panel with information regarding the way in which BUas guarantees the programme's quality. BUas' strategic plan, the central Planning and Control cycle (PDCA-cycle) and the AGM Quality Management System policy form the core of the programme's quality assurance. The Participation Council, the Programme Committee, the Assessment Committee and the Industry Advisory Council, are responsible for the checks and balances within the organisation and the development of education.

BUas uses different instruments to guarantee the quality of its education, such as round table meetings, the national student survey (NSE), National Alumni Monitor, employee satisfaction surveys and performance interviews. Round table meetings are used to increase and monitor the quality of the programme. These meetings are evaluative talks between class representatives and the programme manager. During these meetings, students can share their opinion and how they experience the overall quality of the programme. The round table meetings can also potentially provide BUas with information that could lead to implementing other didactical methods or change course contents. The NSE, National Alumni Monitor, employee satisfaction surveys and performance interviews are regular quantitative evaluations that measure student, alumni and employee satisfaction. The quality assurance process is subject to external quality assessments by the Industry Advisory Council and the NVAO. The panel believes that the quality assurance is up to standard, based on the structural and cyclical process including regular qualitative and quantitative evaluations.

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[11] When students opt for an internship in year 4, they will be supported by a supervisor from both the university as well as the company where students do the internship.
[12] Deliverables are products or services that need to be provided at the various steps of a project as well as at the end of a project.

According to the panel, the university of applied sciences has a functional quality assurance system. BUas uses the PDCA-cycle and evaluates on a regular bases to improve the quality of their overall education. The panel determines that the quality assurance of the ADS&AI programme is sufficient and that the criteria for this standard are therefore met.

6.10 Standard 10: Student assessment

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

Judgement
Meets the standard.

Findings, analysis and considerations
The bachelor ADS&AI uses an assessment policy that is based on that of the Academy for Games and Media. This policy establishes the assessment processes and guarantees the assessment quality. The details of the assessment policy are outlined in the ADS&AI Assessment Plan and the Testing and Exam Regulations. The academy has a central Board of Examiners that is responsible for the assessment process. They have mandated the Assessment Committee to assess the validity, reliability and transparency of the assessments in year 1 to year 3. The quality assessment of year 4, the final phase of the programme, is not handed over to the Assessment Committee and falls under responsibility of the Board of Examiners. The Board of Examiners monitors the graduation assessment and conducts randomised spot checks on graduation projects.

The Board of Examiners has been involved by the development of the programme from a very early stage. The expertise of the board members with the bachelor programme Creative Media and Game Technologies proved to be very useful. The ADS&AI has the same assessment method as the Creative Media and Game Technologies bachelor and also falls under the responsibility of the Board of Examiners. During discussions with the Board of Examiners, the panel asked if they can guarantee that the hbo-bachelor level of the assessments is met. The representatives confirmed that this was the case. They clarified that the learning outcomes are based on the Dublin descriptors, first cycle[13]. The Dublin descriptors guarantee the hbo-bachelor level. The representatives told the panel that they will continue to be involved by the ADS&AI to ensure that the hbo-bachelor level of the programme continues to be met. The panel is positive about the Board of Examiners' involvement and the way in which the quality of the education is assessed.

The Academy's assessment policy has been developed to assess knowledge and skills at a project level. Knowledge and skills that students acquire during courses form part of the project learning objectives and are not assessed separately. The assessment policy also uses formative assessments to establish students' individual learning processes. Formative assessments are designed to provide students with regular feedback, -up and -forward and requires students to thoroughly reflect on their individual professional development. The results of these formative assessments are recorded in the learning logs. The programme also has summative assessment moments in which learning outcomes are individually assessed at the end of a block. BUas assesses students individually to ensure that every student can proof that they have achieved the intended learning outcomes. For each summative assessment, students have to provide project evidence consisting of the project results, the learning log, the work log and their self-assessment. The panel appreciates the focus on the learning process of students. Using feedback, -forward and -up ensures that assessments have a developmental impact on their learning. The fact that BUas assesses students individually is another positive aspect. The panel believes that individually assessing students prevents students from being able to hide behind the group results of a project. Something that requires attention however is the fact that the summative assessment moments are only at the end of a block. The panel fears that these one-off block assessments might be

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[13] The first cycle is equivalent to the bachelor's level.

too time consuming for students. It recommends to the programme to find ways of breaking this up into smaller assessments.

During the online site visit, the panel asked if BUas is expecting too much from students when it comes to (self) reflection. Students are expected to track their progress in their learning logs, which consists of three parts: weekly reflections, reflections on the intended learning outcomes and block reflections. The weekly reflections consist of the projects' process, mistakes students made during that week, received feedback and accomplished achievements. The reflections on the learning outcomes include reflections on students' personal development and academic practice, professional practice, and technical research. Block reflections consist of students' achievements, things students learned and their progress. The Board of Examiners does not think that BUas is expecting too much. BUas sees reflection as a part of continuous (personal) development. The Board ensures that in the first year, students are guided in developing reporting skills in order to be able to write their reflections properly. The ability to self-reflect also comes in handy in students' future careers, because professionals constantly reflect on project progress and one's own actions. It is positive that students are encouraged to reflect on projects and individual actions during projects, but the panel believes that the programme has too many reflection moments which could become counterproductive. The panel therefore recommends to create a better balance between the work load that comes with self-reflection and the benefits of it.

In the discussion with the Board of Examiners, the panel asked about students' responsibility regarding their learning process and whether students can choose which of the intended learning outcomes they want to achieve. The representatives elaborated that the programme becomes more and more abstract through the years. In year 4, students have to work on a project where they choose the role of either Data Modellers/Scientist, Data/AI engineer or Data Consultant (Digital Transformation Specialist) and follow the steps of the CRISP-DM cycle. They will have to determine the content and the deliverables, based on the learning outcomes. The content and deliverables are together with the university supervisor[14] and recorded in a graduation plan that students submit to the Board of Examiners. The objective is to achieve every single one of the 11 intended learning outcomes on the hbo 3 level. Depending on the role students choose, they will focus on certain aspects of the learning outcomes more than others. The panel is positive about the graduation phase of the programme. This phase offers students the opportunity to specialise in the future role that appeals to them most. One small area of concern is the self-assessment graduation rubric that students need to submit for the summative assessment. The panel believes that the self-assessment graduation rubrics are not transparent enough in terms of grading. The panel recommends to outline the rubrics in more detail.

In summary, the panel is positive about the way in which the assessment methods promote student's learning processes. The Board of Examiners is closely involved by the programme and, together with the Assessment Committee, ensures adequate safeguarding of the assessment quality. Based on the above, the panel determines that the assessment component of the programme meets the requirements.

6.11   Degree and field of study

The panel advises awarding the following degree to the new programme: Bachelor of Science.
The panel supports the programme's preference for the following field of study: Technology (CROHO sector Techniek).

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[14] When students opt for an internship, they will be supported by a supervisor from both the university as well as the company supervisor.

7 Assessment of the distinctive feature 'Small-scale and intensive education'

7.1 Criterion A Intended learning outcomes

The objectives and intended learning outcomes are aimed at achieving an above-average level in one or more academic disciplines and/or professional practices in the domain concerned. In addition, the programme focuses on the broadening and development of related personal attitudes and skills.

Judgement
Does not meet the standard.

Findings, analysis and considerations
BUas strives to offer a state-of-the art programme that has a higher graduation rate than comparable programmes. In order to achieve this above-average level of education, BUas intends to stand out in a number of ways. One way that BUas describes in the information file is the competency profile, which, according to BUas, is much more comprehensive than in other bachelor programmes in the technology domain. The ADS&AI profile consists of programming and computer skills, Data Science, AI, business and process design, change management and legal and ethical aspects. ADS&AI students are trained to develop every skill at the highest existing level (hbo level 3). BUas also wants to stand out by means of the student-oriented, practical project work in the DataLabs. According to BUas, the DataLabs act as a catalyst to increase students' professional awareness. Students learn to develop well thought out arguments and report and present results in a manner that is understandable and appropriate for different stakeholders. Students will also learn to take initiative in a team.

Another feature of the programme is the description of the programme's final qualifications as project-corresponding learning outcomes which are further defined and assessed through behavioural indicators. This enables BUas to better track students' progress. The project-corresponding outcomes also enable students to understand the expectations BUas has for their professional development. This adds to an intensive way of learning and strengthened competences and thus professional growth. Other features that BUas includes in the programme are a strong focus on professional standards and necessary skills to take on a development role[15] during a project. Additional information requested by the panel prior to the online site visit showed that BUas also expects to achieve the above average level thanks to BUas' ambitious culture. During the online site visit, the programme management explained that from day one, students and lectures are expected to form a community. A community where students work with ambitious fellow-students and motivated lecturers, using state-of-the-art software. BUas' internal culture is student centred and focuses on enhancing students' individual learning process, with regular reflection and feedback moments. Management also stated that alumni and the professional field highly appreciate the very strong direct feedback culture. The panel is positive about the programme, but notes that the programme's features are not unique for higher education programmes. More and more hbo programmes offer project-education where students work on real-life projects. Regular reflection and feedback moments are also common for other hbo programmes as well as focusing on students' professional and personal development.

The panel does not doubt the quality that BUas can deliver. BUas is a highly ranked university, has prior experience with this type of programmes, and has proper processes in place to lift students to a hbo 3 level. However, the programme and final level is not different from the ADS&AI programme of THUAS. THUAS and BUas have designed the ADS&AI bachelor programme together, but THUAS hasn't applied for the distinctive feature "small scale and intensive education".

According to the panel, BUas has provided insufficient evidence to show that the ADS&AI programme achieves an above-average level. The panel bases this conclusion on the fact that the features described by BUas are not unique and that the ADS&AI bachelor of THUAS is almost identical to the BUas' ADS&AI. Therefore, the panel determines that criterium A does not meet the requirements.

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[15] The role of: Data Modeller/Scientist, Data/AI engineer, or Data Consultant (Digital Transformation Specialist).

7.2 Criterion B Curriculum: contents

The curriculum and the extracurricular activities are inextricably bound. Their contents tie in with the intended level and the broadening as formulated in the intended learning outcomes. Students and staff share responsibility for the organisation of the extracurricular activities.

Judgement
Meets the standard.

Findings, analysis and considerations
The panel is positive about the inspiring extracurricular activities, for example Cradle. Cradle is a research and development lab, meant to design and develop innovative games and media applications. Cradle helps students gain experience in researching and developing new technologies and designing concepts and applications. Students work together with lectors of the three research groups related to Cradle: Digital Media Concepts, Creative & Entertainment Games and Applied Games, Innovation & Society. At the time of the site visit, the lab was focused mainly on games and media, but BUas has plans to expand to Data and AI research.

Students also actively participate in other extracurricular activities. BUas offers all sorts of workshops and excursions to gain interest-specific experiences and form expert groups or guilds. Expert groups are learning communities consisting of students from all years, as well as lecturers, alumni and industry professionals. Both students and lecturers can start an expert group. Expert groups are formed based on a specific interest or a question about a particular topic. Expert groups meet regularly to exchange ideas and to help each other solve problems and are supposed to expand and deepen students' interests.

BUas also encourages student to participate in CLUBS@BUas. The goal of CLUBS@BUas is to create a strong community of local and foreign students and lecturers. CLUBS@BUas is a collection of different clubs such as cooking clubs, yoga clubs, neurodiversity clubs and band jam clubs. These initiatives allow students to get to know other students and provide new students with a smooth landing and support systems.

The extracurricular activities are linked to the programme's learning outcomes. Expanding knowledge and skills, and strengthening the bond with fellow students and lecturers, will, according to BUas, contribute to the realisation of project learning outcomes. During discussions with the development team, the panel learned that BUas regularly evaluates extracurricular activities through questionnaires, roundtable discussions and learning logs. The panel believes that Cradle, the expert groups and CLUBS@BUas are inspiring extracurricular activities. The activities are a continuation of existing initiatives and methods from the Academy.

All in all, the panel believes that BUas offers a comprehensive curriculum with several extracurricular activities that can help students become highly skilled ADS&AI professionals. The panel determines that criterium B meets the requirements.

7.3 Criterion C Curriculum: learning environment

The teaching concept is based on a challenging learning environment, education substantiated in a small-scale and intensive manner, and a learning community of students and staff. The small-scale and intense nature of the education is demonstrated by the level of participation and preparation that is expected from students. The curriculum is structured in such a manner as to ensure nominal study progress by the students, including extracurricular activities.

Judgement
Meets the standard.

Findings, analysis and considerations
The curriculum has been designed to provide small-scale and student-centred education. The ADS&AI programme has a total of 19 face to face hours per week, excluding hours spent on extracurricular activities (for example guilds and the Cradle lab). Students will develop different team roles and investigate which role fits their interests and talents most: the role of Data Modeller/Scientist, Data/AI engineer and Data Consultant (Digital Transformation Specialist).

Programme management and the development team clarified that DataLabs form the core of the small-scale intensive education. In the DataLabs students work two days a week from 9 to 5 on real-life projects. Each DataLab has two lecturers present. Lecturers offer intensive guidance and study assistance and focus on collaboration and co-creation instead of instruction. Communication between students and lecturers is thorough, personal and direct. Each project follows the same project cycle (CRISP-DM). CRISP-DM enables agile working and is highly dependent on feedback. Students gather proof of their input in the project and record their progress in learning logs. An important part of the project cycle is receiving regular feedback from lecturers and fellow students.

The remaining days of the week consist of students conducting self-study. Self-study takes place in a digital learning environment that allows students to gain knowledge by watching (digital) instructions and participating in (online) workshops. During the self-study hours, students get the opportunity to attend university for additional tutoring when necessary. Each self-study day ends with a Q&A session. In the first year of the programme, classroom online activities are organised by the teaching team and students receive instructions from their lecturers. Over the course of the next 3 years, instructions given by lecturers decreases. Students will also get increasingly more responsibility over setting their own learning goals.

BUas expects that both the DataLabs as well as the digital learning environment will encourage students to actively participate in the programme. The panel is excited about the DataLabs and the digital learning environment, but believes that the number of self-study hours are too steep, even for a small scale and intensive education programme. The panel wonders if students can be motivated to spend three days every week on self-study. In the situation that BUas is awarded the distinctive feature of small scale and intensive education, which allows BUas to select (highly ambitious) students, it will still be hard to motivate students for the vast amount of self-study hours. The panel advises BUas to create a programme that offers a learning environment for acquiring the necessary theoretical knowledge where students don't solely rely on self-study.

The panel is enthusiastic about the DataLabs. DataLabs fuel innovation, collaboration and co-creation and encourage students to reflect on their individual personal development. Another element of the programme the panel is positive about, is the digital learning environment because it enables collaborative learning within the learning communities. The large number of hours students spend on self-study was a concern for the panel. If awarded the distinguishing characteristic of small-scale and intensive education, students should be given the tools to motivate themselves for this amount of self-study hours. Nevertheless, the panel advises to create a more balanced programme that doesn't rely as much on self-study.

7.4   Criterion D Intake

The programme has a sound selection procedure in place, aimed at admitting motivated and academically and/or professionally talented students, in which the criteria include suitability for and interest in the small-scale and intensive educational concept, in combination with extracurricular activities.

Judgement
Meets the standard.

Findings, analysis and considerations
The information file outlined that BUas expects 100 students to apply for the ADS&AI in the year 2022-2023, but this number has been reduced to 50 in the first year according to the programme management. The long-term goal is to attract 100 students per year. The distinguishing feature that BUas is requesting will make it possible for BUas to select students for the bachelor programme. By being able to select the most talented and motivated students, BUas wants to achieve several things, including more students successfully completing their first year, more students completing the programme within 4 years, and offering students the best starting position for their careers.

BUas has designed a rigorous selection process that consists of four mandatory parts. Applicants will receive an invitation for a personality test that will assess the student's ability to work in a group setting in the DataLab. Prospective students also have to submit a motivation letter and a certificate stating they completed the National AI Course. Then, students are invited for a face to face meeting on location (or online) to discuss their application and willingness to follow a programme with a high level of student participation. Matters like self-motivation and autonomy will also form part of the interview.

As BUas wants to be able to select students, the panel asked if mbo-4 students have any chance of being selected. The programme management stated that these students will indeed be able to get into the programme. BUas' experience is that mbo-4 students perform really well in a small-scale programme and in guilds. The panel is pleased that BUas does not exclude mbo-4 students from the selection process, but rather bases their decision on talent and motivation.

The panel believes BUas' vision on the selection process to be clear and appropriate for the small-scale and intensive education concept. Particularly the different elements that are assessed (skills, knowledge and personality) make the selection process strong. Based on the above, the panel determines that the criteria for criterium D have been met.

7.5 Criterion E Staff

The number of staff is sufficient in terms of providing small-scale and intensive education, substantiating close contact between staff and students, and providing individual counselling to students outside the educational context. The staff demonstrably command the specific expertise and skills required to achieve the objectives of small-scale and intensive education. The programme actively monitors that teachers hold the required qualifications and, if necessary, ensures that teachers are trained in these aspects.

Judgement
Does not meet the standard.

Findings, analysis and considerations
BUas provides new lecturers with the support they need to achieve the required qualifications in English, didactics and BKE (Basic University Examiner Qualification). Lecturers all hold a relevant master's degree and have experience working in AI related professions. To keep their professional knowledge up-to-date, lecturers are encouraged by the Academy to do internships within local companies. BUas also offers trainings such as teamwork and building learning communities with the Belbin Team Roles tool. The panel is positive about the support and training BUas offers lecturers. Internships can expand and deepen the knowledge and skills regarding lecturers' expertise. The teamwork and building learning communities trainings fuel community building, and contributes to teaching small-scale and intensive education courses.

The information file outlines that the student-teacher ratio is 20:1 with the core teaching team. This does not include guest lecturers, freelancers, external supervisors and support staff. Management admitted that the current student-teacher ratio is indeed 20:1, but BUas wants to lower this to a 10:1 ratio by hiring an extra 3 fte (April 2022). The panel asked how BUas intends to recruit lecturers in a labour market with a high demand for data professionals. The programme management explained that

BUas will expand their focus beyond the Dutch borders, approach alumni and use 'hybrid lecturers' when needed. Another option is to use lecturers from the Creative Media & Games Technologies bachelor.

The panel appreciates the recruitment options BUas has, but has concerns that BUas won't be able to find enough qualified staff before the start of the programme. Also, what happens when one of the lecturers get sick? The panel emphasised the importance to make a risk analysis for recruiting lecturers. Additionally, BUas should have multiple scenarios for hiring lecturers including a backup plan in case BUas does not succeed in hiring lecturers. The panel also stresses that it is important to ensure that the newly appointed lecturers receive the same kind of training and support as the current team.

The panel is positive about the support and training that lecturers have access to. However, the panel believes that the current team of lecturers is too vulnerable due to its small size. BUas has to recruit more lecturers in order to achieve small-scale and intensive education. The panel thinks that the severe shortage of data professionals on the labour market can cause issues for recruiting lecturers. The panel advises BUas to think about what happens if they can only recruit part of the lecturers they need or none at all. Based on the above, the panel concludes that criterium E does not meet the necessary requirements.

7.6   Criterion F Facilities

The programme has its own infrastructure with facilities for small-scale and intensive education and common extra-curricular social activities.

Judgement
Meets the standard.

Findings, analysis and considerations
Based on the information file and a video, the panel got a good impression of the BUas university building and the facilities that BUas offers. The bachelor ADS&AI will have a designated space on the BUas campus. A space that lets students and lecturers work closely together and where they form an ambitious learning community. If the distinctive feature is granted, BUas will provide advanced software and hardware for students to use in projects and for the development of Data and AI.

BUas main facility is the DataLab: a physical project environment to work on practical assignments. Online education is provided via the Learning Management System (LMS). The LMS gives students access to all BUas learning systems, including Github Classroom. Github Classroom is an online platform where students and lecturers work on projects together. In the Github Classroom, students work together on a group assignment in a shared repository, just like a team of professional developers do. The online Classroom also makes it possible to provide students with feedback and remote support to students during internships and exchange programmes. Access to learning environments such as Code Academy, LinkedIn Learning and other external resources are also an important part of the LMS. The panel is positive about the university building and the facilities that BUas offers. Both the DataLabs and the digital facilities contribute to the small-scale education that BUas wants to facilitate. The DataLabs offer a stimulating project environment for students to work on practical assignments. The Github Classroom is great for working together online. The Github Classroom platform is one of the core systems that makes collaborative learning within the learning communities possible.

The panel believes that the campus and facilities will help students in becoming highly skilled professionals. The panel determines that the facilities are sufficient and that the requirements for criterium F have been met.

7.7   Criterion G Achieved Learning Outcomes

The information file contains several claims as to why the bachelor's degree in ADS&AI leads to substantially higher success rates than other comparable programmes without the distinctive feature. These claims are backed up by BUas offering realistic projects, extensive coaching, a strong learning community, extracurricular activities and the close relationship with local companies.

During the site visit, the panel explained that, based on the provided information, it cannot determine if the graduation rate will indeed be higher than normal. The panel expected data and comparisons with other hbo-bachelor programmes. The panel has offered the programme management the opportunity to provide proof of the claims this during the online site visit. The ADS&AI is the first Data Science and AI hbo-bachelor programme in the Netherlands and it is therefore, according to the programme management, not possible to compare it to other programmes. In the overview that BUas provided, the management outlined that BUas programmes achieve better graduation results than similar programmes from other universities. They also stated that graduates of BUas' bachelor programme Creative Media and Game Technologies are getting highly sought-after jobs. However, as mentioned in Criterium A, the panel believes that the programme and the final level are similar to the ADS&AI programme of THUAS. The panel is therefore not convinced that BUas will achieve substantially higher success rates than THUAS.

In the panel's view, BUas has provided insufficient evidence to show that the ADS&AI programme will achieve an above-average success rate. The features of BUas' ADS&AI are hardly different from THUAS' ADS&AI bachelor. The panel therefore deems it unlikely that BUas' ADS&AI programme, will have a significant higher success rate than THUAS' ADS&AI bachelor. The panel determines that criterium G does not meet the requirements.

Abbreviations

ADS&AI	Applied Data Science & Artificial Intelligence
BUas	Breda University of Applied Sciences
CRISP-DM	Cross Industry Standard Process for Data Mining
ECTS	European Credit Transfer System
FTE	Fulltime equivalent
hbo	higher professional education (hoger beroepsonderwijs)
NSE	National student survey (Nationale Studenten Enquete)
NVAO	Accreditation Organisation of the Netherlands and Flanders ederlands-Vlaamse Accreditatieorganisatie)
THUAS	The Hague University of Applied Sciences

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