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B Applied Data Science & Artificial Intelligence

Breda University of Applied Sciences

Advisory report of the assessment of the existing programme  
12 March 2025

## Colophon

### Institution and programme

Breda University of Applied Sciences

Breda

Institutional Audit: not applicable

Programme: B Applied Data Science & Artificial Intelligence

Site: Breda

Mode: fulltime

ISAT-number: 39309

### Assessment panel

Rob Koper, chair

Peter Becker, expert

Frans van den Akker, expert

Gerwin Pol, student-member

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## Summary

On 12 March 2025, the so-called 'assessment after three years' of bachelor's programme Applied Data Science & Artificial Intelligence (ADS&AI) of Breda University of Applied Sciences (Buas) was carried out. The panel's overall judgement is positive.

### Assessment

The panel is positive about the way assessment is organised and carried out in the ADS&AI programme. Assessment is geared toward enhancing student learning through regular feedback as well as formative and summative assessment. Throughout the programme, students receive feedback from lecturers, fellow students, and industry professionals to enhance their learning. Students highly appreciate the feedback and record it, together with the professional products and reflections, in their portfolio. The bachelor uses carefully designed project ILOs which have been well translated into clear assessment criteria. The project ILOs and assessment criteria are defined in the assessment rubrics.

AGM applies a strong quality assurance system. The various procedures provide lecturers and committees with ample tools to ensure the quality of assessment. The panel expresses its appreciation for this system, as well as for the dedicated and committed team of lecturers. Together with the well-functioning assurance committees, lecturers are committed to continuous improvement of the ADS&AI. The panel discussion with students shows that they are positive about the way changes are being implemented within the bachelor.

The panel establishes that the programme meets this quality aspect.

### Achieved learning outcomes

The panel is positive about the achieved learning outcomes of the ADS&AI. BUAs succeeds in preparing students to become independent,

analytically strong professionals with relevant working experience.

At the time of the site visit, no students had yet graduated from the ADS&AI. The panel reviewed a selection of completed projects to assess the achieved bachelor's level. The panel members are pleased with the quality, level, and assessment. The panel has made some suggestions to further strengthen the programme regarding research, ethics and sustainability.

Students are very pleased about the way BUAs prepares them for industry. They see the combination of theory, practical work and personal development as great added value in preparing them for their careers. Students feel confident about their future careers because they are taught to solve complex real-life challenges by themselves during the programme. They learn to fulfil different project roles, such as scrum master and product owner. From the third year, students start moving toward of the three roles within the ADS&AI field: data scientist, data engineer or analytics translator.

Both companies that provide assignments as well as internship companies praise the students' level of knowledge and skills. ADS&AI students are characterised by a hands-on approach, analytical thinking skills, and strong collaboration skills. Employers appreciate students' self-reliance and knowledge related to current technologies and methodologies

The panel establishes that the programme meets this quality aspect.

### Suggestions

With the future in mind, the panel offers the following suggestions:

- Assessment rubrics: Consider revising the assessment rubrics to define specific performance levels for each project-ILO.
- Research: Outline the research requirements for internship projects and draft clear guidelines in the internship project's study guide.
- Ethics and sustainability: Explore opportunities to focus more on ethics and sustainability. To effectively cover these topics, it is important that lecturers attend adequate training in this regard.

The panel establishes that both quality aspects have been assessed positively.

On behalf of the full assessment panel,  
Utrecht, April 2025

Rob Koper  
Chair

Yvet Blom  
Secretary

## Introduction

### Profile

Breda University of Applied Sciences (BUas) is a university of applied sciences with a strong international focus and where more than 7,000 students are currently studying. BUas consists of five academies, offering programmes across nine domains: AI, Built Environment, Facility, Games, Hotel, Leisure & Events, Logistics, Media and Tourism. BUas combines practice-oriented education with applied research and works closely with industry, education, and research partners.

BUas' mission is to inspire students and employees to fully develop and use their talents and innovative powers. With this mission, BUas aims to contribute to pioneering solutions for businesses as well as society as a whole. A distinctive feature of BUas is its small-scale educational environment, which is formed by learning communities. In these learning communities, meaningful learning experiences play a key role. Students work on solutions to social and industry challenges together with lecturers, researchers and professionals from the field.

### *The programme*

The four-year bachelor's programme Applied Data Science & Artificial Intelligence (ADS&AI) consists of 240 EC and falls under the Academy for Artificial Intelligence, Games & Media (AGM). AGM also offers the bachelors Creative Business and Creative Media & Games Technology, and the masters Media Innovation and Games Technologies. AGM provides small-scale and intensive education, in which project-based learning is a core element. Every bachelor programme within AGM has the BKKI (special feature small-scale and intensive education) certification. This allows AGM to use a selection procedure for its bachelors..

The ADS&AI educates students to become professionals who can analyse business processes, know the potential of data and AI and implement digital transformations. During the programme, students work in so-called DataLabs on real-life research projects addressing data-related issues. At the beginning of the third year, students choose one of the following specialisations: data scientist, data engineer or analytics translator. The specialisations are based on the various ADS&AI roles students are expected to fulfil after completing the programme.

The ADS&AI started in September 2021 as a variation of the bachelor's programme Creative Media & Games Technology. The first batch of students will graduate in the summer of 2025.

### *Curriculum*

The ADS&AI consists of four years. The first two years are divided into four 10-week blocks. From the third year, the block system is abandoned and semesters are introduced. The curriculum becomes increasingly more complex as the course progresses and the degree of independence expected of students intensifies also. In the first year, a solid academic and practical foundation is laid. In subsequent years, the focus lies on in-depth study.

The programme has two different tracks: the regular track (four years) and the fast track (three years). The fast track option is intended for students with a Dutch vwo diploma or (international) equivalent level. The fast track students follow the same curriculum as the regular track for the first two years, but skip the third year. The third year is meant to prepare students for the graduation project in the fourth year. Fast track students, considered faster learners,

can complete their graduation project independently and skip this preparation phase. In year 4, the two tracks differ from each other. Regular track students have the choice between an internship, a minor or an international exchange programme. The fast track students do not have this choice. For them, an internship is mandatory. In the second semester, the two programmes run parallel again. All students work on their graduation project during the second semester of the fourth year.

#### The Initial Accreditation Assessment

In May 2022, this programme was assessed by the NVAO. The present 'assessment after three years' is mandatory for new programmes offered by an institution without ITK recognition and where no actual education has yet been provided. This assessment focuses on the following two quality aspects:

- The quality of assessment
- The achieved learning outcomes

#### The assessment

BUas commissioned AeQui to conduct this assessment. To this end, AeQui, in collaboration with the programme, assembled an independent and competent panel.

The assessment was conducted based on the Assessment Framework for the Accreditation System of Higher Education in the Netherlands (2024), following the schedule outlined in Appendix 2.

The panel carried out the assessment independently and received the necessary information to reach a well-founded judgement. At the end of the assessment, the programme was informed of the panel's findings and conclusions.

This report was first shared in draft form with the programme. The programme's feedback was taken into account in the preparation of this final report.

## Assessment

### Findings

The Applied Data Sciences & Artificial Intelligence (ADS&AI) bachelor's programme is based on the assessment policy of the Academy for Games and Media (AGM). In line with BUAs' institution-wide assessment policy, AGM has defined, in the Academy for ADS&AI's Assessment Policy 2022-2025 document, the frameworks for assessment, the provision of feedback, and quality assurance. By applying these frameworks, AGM ensures that the entire assessment system is valid, reliable, and transparent. The assessment system for the ADS&AI has been further specified in the 'Teaching and Examination Regulations ADS&AI 2024-2025' (TER), which describes the rights and obligations of students regarding courses and examination.

### *Vision on assessment*

AGM views assessment as a means to support student learning and contribute to achieving the Intended Learning Outcomes (ILOs). Assessment is seen as the starting point for students' further development during the programme, rather than the end point. To fully support students during their learning process, AGM utilises formative assessment and feedback in addition to summative assessment. Summative assessment aims to determine the extent to which students master the learning outcomes. Formative assessment focuses on the (professional) development of students. During formative assessment, students are told which aspects are going well and which could be improved. These moments offer both students and lecturers insight into students' progress and learning needs.

### *Assessment system*

Each term, students work on projects focusing on a data-related challenge based on real-life data or real life projects. These projects are carried out in DataLabs and follow a consistent structure. Students begin by studying the project brief, which includes the project description, the ILOs and the assessment rubric. During the first lesson of the block, in a so-called kick-off session, the project and its associated project ILOs are explained in more detail. Students indicated to the panel that the combination of the project brief and verbal explanation helps them gain a clear understanding of what is expected of them throughout the block and how to demonstrate their mastery of the project ILOs.

The students the panel spoke to indicated that they find it motivating to work on field-based assignments. Additionally, they appreciate that they work on both professional and personal goals during the programme. Such goals may tie in with the project and the project ILOs or focus on extracurricular activities. The addition of professional and personal goals allows students to further expand their skills and knowledge by working on extracurricular projects, broadening their learning process.

Students keep track of their progress in a work log and a learning log. The work log consists of a spreadsheet where, for each week of the project, students record the tasks, work performed and the corresponding project ILO for each day. The learning log is a portfolio that students use to demonstrate their progress with supporting evidence, such as data analysis, reports, presentations, test results, feedback, and personal reflections.

Throughout the projects, students receive regular feedback from lecturers, fellow students and industry professionals. Students find this feedback highly valuable for their development. During the panel discussion, the programme management explained that within the ADS&AI great importance is placed on giving good feedback and that BUas invests in a strong feedback culture. All ADS&AI lecturers are required to complete a mandatory training on providing effective feedback. Additionally, students learn from the very beginning of the bachelor's programme how to give constructive feedback to one another.

In addition to feedback, students also receive at least three individual formative feedback sessions per block. In these sessions, students discuss complex challenges in designing or developing applications, as well as other relevant issues they encounter during the block. Students record the outcome of the formative feedback sessions in their learning log. Summative assessments are conducted at the end of each block. These consist of assessing students' individual contribution to a project using the work log, learning log (including professional products), a self-assessment, and a final presentation. A component of summative assessment is personalised feedback which is included in the comments column of the assessment rubrics.

While students benefit from regular formative feedback sessions, the panel noted that it remains unclear to what extent formative feedback is taken into account in the summative assessment. Currently, summative assessment appears to be based mainly on the end product. The panel therefore advises making the role of formative feedback in the summative assessment more explicit.

#### *Graduation phase*

In the final semester of the ADS&AI, students conduct an individual graduation project within the digital media domain. They may choose to conduct their graduation project for a company to solve a data related challenge or develop an application. Students aspiring to become entrepreneurs can choose to use the establishment or further development of their business as their graduation project. Students wishing to pursue a master's degree after completing the ADS&AI can choose to conduct academic research in collaboration with the BUas Research & Development group. This option is subject to a selection procedure and is not freely admissible.

The final outcome of the graduation project is a portfolio in which students demonstrate that all project ILOs have been achieved. The portfolio contains at least a learning log, work log, and a professional product. Students can deliver several types of professional products: a research report for a client (a company), a model or application for their own business (including a business plan), or an academic thesis commissioned by the BUas Research & Development group.

#### *Assessment rubric*

Projects are assessed summatively by lecturers at the end of each project. Students are assessed individually for their contribution to the project. This is done with an assessment rubric that contains the criteria for assessing the project ILOs. Students are assessed per project ILO on at least one of the following categories: research, product, project management, professionalism, and learning. Students informed the panel that they actively use the assessment rubric throughout the block to evaluate their work and ensure their assignments meet the criteria. At the end of each block, students reflect on their role and contributions to the project using

the assessment rubric. They also use the rubric as a tool for peer assessment within their learning community. Lecturers take students' self-evaluations into account in the final assessment.

During the discussion with lecturers, the panel noted that the assessment rubric does not specify the performance levels required for each project ILO to achieve a pass, good or excellent. By using rubrics without separate levels of performance, it may be unclear for students how to improve their work or what is required to obtain a higher grade. The panel therefore recommends revising the assessment rubric by clearly defining distinct performance levels for each project ILO. Such a revision would enhance transparency and give students a clearer understanding of the specific actions and behaviours that correspond to different levels of performance.

#### *Assessment*

All assignments are assessed using the four-eye principle. Each assessor holds a Basic Examination Qualification (BKE). The first assessor conducts the initial assessment, after which a second assessor reviews a sample of the completed assignments. This process ensures that assessment standards are uniformly applied and minimises subjective differences.

Graduation projects are assessed by three separate assessors. For the assessment of graduation projects, the first assessor is the student's graduation supervisor, the second assessor is an independent assessor (another ADS&AI lecturer from BUAs) and the third assessor is an independent expert (not affiliated with BUAs). The third assessor's role is to advise the first two assessors on their joint assessment. In addition, the third assessor conducts evaluations on assessments and reports its findings to the quality manager. The quality manager, in turn, reports

to the Course and Assessment Support Team (CAST). CAST is an academy-wide committee that oversees the quality of education and assessment of all AGM-programmes. BUas also discusses graduation projects and assessments during national ADS&AI meetings, where ADS&AI lecturers (examiners) from other Universities of Applied Sciences review a sample of submitted work to ensure consistency in assessment.

#### *Generative AI*

BUas has established clear guidelines for the use of AI. The panel discussion with students showed that they know the guidelines well and apply them accordingly. BUas uses five clear levels of possible AI use: 1) No AI use, 2) AI-assisted idea generation and structuring, 3) AI-assisted editing, 4) AI for specified task completion, and 5) Full use with human oversight. Students know prior to assignments in what ways they may use AI. Students indicated that the complexity and context-specific nature of the projects makes misuse of AI highly unlikely.

#### *Quality assurance of assessment*

At academy level, the bodies responsible for assuring the quality of assessment include the Board of Examiners and the CAST. At programme level, assurance is provided by the Assessment Committee, the Degree Programme Committee and the quality manager. In accordance with legislative regulations, the Board of Examiners (AGM-broad) ensures the quality of the assessment, the guarantee of the final level of the programme and the appointment of examiners. The CAST consists of a group of experts who advise lecturers and committees on the overall quality of the bachelor's education and assessment and ensure consistency across all programmes within the academy.

Working under mandate of the Board of Examiners, the Assessment Committee verifies if the assessment rubrics are valid, reliable and transparent. In addition, the Assessment Committee checks whether the rubrics are in line with the project ILOs and the project ILOs with the programme-wide ILOs. The Assessment Committee reports to the teaching team and liaises with CAST if necessary. The Degree Programme Committee assesses the overall quality of education and approves or rejects curriculum changes based on its review. The quality manager is responsible for monitoring the overall quality of the education and assessment per block. Tasks of the quality manager include coordinating student evaluations and managing documentation related to block evaluations.

The Board of Examiners informed the panel that the quality of assessment is a top priority within the academy. Together with CAST, and the Assessment Committee, they provide the academy and ADS&AI with constructive feedback and recommendations for further improving the quality of assessment. The Board of Examiners expressed its appreciation for its collaboration with AGM and ADS&AI management, as well as for the effective follow-up on its findings by AGM and ADS&AI management.

### Considerations

The panel considers that ADS&AI's assessment system contributes suitably to promoting student learning. Assessment is development-oriented and encourages students to study actively. BUAs uses both formative and summative assessment and feedback for the ADS&AI. Throughout the programme, students receive feedback from lecturers, fellow students, and industry professionals. Students record the feedback, together with the professional products and reflections, in their portfolio.

The bachelor uses well-thought-out project ILOs and clear assessment criteria. The criteria are consistent with the programme ILOs. They clarify what is expected of students and contribute to unbiased assessment. The quality of assessment is guaranteed by the four-eye principle and assessment meetings. One area for improvement is the assessment rubric. The current assessment rubric does not specify per project-ILO what performance is needed to achieve a certain final score (such as a sufficient or excellent). The panel recommends revising the assessment rubric to define specific performance levels per project-ILO in separate columns. A redesign like this will ensure that students better understand what is expected of them.

AGM has a strong quality assurance system in place. The various procedures provide lecturers and committees with ample resources to ensure the quality of assessment. The Board of Examiners, the CAST, the Assessment Committee and lecturers are well-versed in the quality and assessment procedures within the ADS&AI. The committees are proactive and fulfil a clearly defined and independent role within the assurance process.

The panel appreciates the enthusiasm and dedication of the teaching team and the well-functioning quality assurance committees. Lecturers, along with the assurance committees, are consistently committed to improving the ADS&AI. During the conversation with students, the panel found that students are positive about how changes are being implemented within the bachelor's programme.

Taking these considerations into account, the panel assesses that the programme meets this quality aspect.

## Achieved learning outcomes

### Findings

At the time of the site visit, no students had graduated from the ADS&AI yet. For the Assessment after three years, the panel reviewed a selection of completed projects to assess the mid-term realised learning outcomes. The panel reviewed a total of sixteen projects by third-year regular track (four years) students and three internship projects by Fast Track (three years) students.

After reviewing the projects of the third- and fourth-year students, the panel members were pleased with the quality, level, and assessment. The panel did note a difference in the extent of research in the internship projects. In some projects there was a strong focus on research, while in others the focus was mainly on participating within the organisation. Students and lecturers explained that internship projects are arranged with the client. For some internship projects, research is not as important an aspect.

Initially, the panel had difficulty seeing a clear distinction between the three roles within the ADS&AI field based on the projects they reviewed: Data Scientist, Data Engineer, and Analytics Translator. However, when speaking with students, it became clear that students start moving toward their chosen roles from the third year onward. Each of the roles is connected to specific project ILOs. Students explained that during the programme they progressively learn the knowledge, skills and responsibilities associated with these roles.

### *Ethics and sustainability*

In talks with programme management, lecturers, and the assurance committees, the panel

noted that ethics and sustainability could be given more attention to in the projects that were reviewed. The main focus in the projects was on the ethical implications of data bias in application development. Sustainability was not or hardly addressed in the projects. Lecturers and students mentioned that while sustainability is addressed in other projects during the programme, it is not part of the project ILOs. In one of the projects, students compare different models for cost and environmental impact. Another project deals with coming up with a potential solution to an organisation's Sustainable Development Goals and using data to prove its effectiveness.

### *Industry connection*

Students said in the panel discussion that they consider the ADS&AI programme intensive but extremely worthwhile. They see the combination of theory, practice and personal development as great added value in preparation for their careers. Students feel confident about their future careers because they are taught to solve complex real-life challenges by themselves. They also learn to fulfil different project roles, such as scrum master and product owner.

Panel discussions with programme management, lecturers, and students show that companies highly value the level that ADS&AI students achieve. Both companies that provide assignments as well as internship companies praise the students' intellectual and working level. ADS&AI students are characterised by a hands-on approach, strong analytical thinking skills and collaboration skills. Employers appreciate students' self-reliance and experience with

current technologies and methodologies with the CRISP-DM cycle.

At the same time, the panel observed that the validation of application functionality does not yet receive the attention it typically requires in industry. Deliverables such as test plans and test results are sometimes missing or underdeveloped. Strengthening these aspects could enhance the CRISP-DM evaluation phase in some of the reviewed projects and better align student output with professional expectations.

### Considerations

The panel considers that the projects that were reviewed are of a good quality, have an appropriate level and are adequately assessed. The projects demonstrate that students are developing the necessary knowledge and skills, both in terms of work practice and analytical thinking.

The panel did note a difference in the amount of research included in the internship projects. In some projects, the research component was strongly present, in others the focus was mainly on participating within the organisation. The panel recommends to draw up the research requirements for the internship projects and to include clear guidelines for the research component in the course manual.

The panel found that ethics and sustainability are covered during the programme, however, there could be more emphasis on both aspects. The panel thinks it would add value for students, clients, and future employers for students to also learn to look at the ethical and sustainability implications of applications on a macro-societal level. The panel recommends BUAs to incorporate more ethics and sustainability elements into the ADS&AI, as these play a major role in developing applications for companies. In addition, the panel recommends lecturers be trained to provide adequate guidance to students on the ethical and sustainability impact of applications.

Both students as well as industry are thrilled with the knowledge and skills covered during the practice-based ADS&AI. Students acquire skills which can be directly applied and are thoroughly prepared for the labour market. Industry is positive about students' analytical and collaboration skills, as well as the extent of self-reliance and knowledge related to current technologies.

Taking these considerations into account, the panel assess that the programme meets this quality aspect.

## Attachment 1: assessment panel

Prof. Dr. R. Koper, Chair  
Professor of Educational Technology and Learning Sciences, Open University

Frans van den Akker, Member  
Programme Manager Digitalisation

Peter Becker, Member  
Senior Lecturer, The Hague University of Applied Sciences

Gerwin Pol, Student Member  
MSc student, Wageningen University & Research (WUR)

The panel was supported by Yvet Blom, certified secretary.

All panel members have completed and signed a statement of independence and impartiality, and these have been submitted to NVAO.

## Attachment 2: site visit programme

*12 March 2025 – NVAO Assessment after three years - Bachelor ADS&AI*

12:00 –12:15	Welcome
12:15 –13:15	Internal deliberations panel & lunch
13:15 –14:00	Meeting with course management
14:00 –14:15	Break
14:15 –15:00	Meeting with Board of Examiners and assessors
15:00 –15:15	Break
15:15 –16:00	Meeting with students
16:00 –17:00	Internal deliberations panel
17:00 –17:30	Feedback session

### Attachment 3: reviewed documents

- Self-Evaluation Report
- TNO Application of Applied Data Science & Artificial Intelligence
- Panel Report on Applied Data Science & Artificial Intelligence
- BUas Strategic Direction 2022–2025
- National Course Profile
- Student Handbook
- Teaching and Examination Regulations (TER) – Bachelor ADS&AI
- Example of a Project Brief
- Example of a Learning Log
- Example of a Work Log
- Assessment Rubrics 2023–2024
- Assessment Rubrics 2024–2025
- Quality Management Policy of the AGM Academy
- Example of a Block Content Overview
- Example of a Block Evaluation Document
- DPC Minutes
- BUas testing framework
- Assessment policy 2022-2025
- ADS&AI Placement Manual
- Graduation Project Manual
- Graduation Project Documentation
- NSE Results
- Work of 19 Students (sixteen projects by third-year regular track students and three internship projects by Fast Track students)

