BASES' POSITION STAND ON ARTIFICIAL INTELLIGENCE (AI) AND ASSESSMENT

Autumn 2023

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CONTENT

AUTHORS' PREFACE

The Position Stand (PS) that follows represents the considered and formal position of BASES on AI and assessment. This preface captures the reflection of authors on the thought process they went through in drafting this work. We hope readers will find this preface helpful in orientating themselves and their practices in relation to what follows. Three aspects capture our reflection:

1. Assessment is an integral part of the teaching and learning process and cannot be considered in isolation. We are therefore conscious of the fact that what follows adopts a holistic position which incorporates learning, teaching and assessment. In short, we do not focus exclusively or narrowly on assessment.

2. AI is developing so quickly ensuring the currency of any work in this area is challenging. The only constant is change.

3. We choose to present a rather conservative view of the impact of AI. That is, we deal with AI as it existed in the public domain whilst we were drafting this Position Stand over the summer and early Autumn of 2023. In doing so we view AI as a positive development that in some contexts can be viewed as a 'Digital Assistant' that if used correctly can improve student and academic productivity. However, we recognise that it is entirely possible, indeed likely, that AI could result in both i) major societal & economic disruption and ii) a paradigm shift in education. For example, this might include mass unemployment across the economy and AI replacing many roles currently held by academics and professionals.

Whilst it is entirely possible to present a dystopian view of the near future, we made the conscious decision not to do so. This is not because we think it is certain that such a future will not come to pass but because we are optimists who want to offer practical, relevant advice for the here and now.

EXECUTIVE SUMMARY

1. The purpose of this Position Stand is to support colleagues who are involved in the assessment of students. It is not intended to be prescriptive, nor does it seek to impose a set of criteria. Rather it seeks to state the current thinking of the Association in this fast-changing area and provide a resource that readers will find helpful.
2. For those who do not have the time to read the whole document, it is structured so that some sections are 'standalone' and others can be skimmed. We have also provided an extensive reference list that readers can use for independent study.
3. The following position statements are made in this document.

BASES adopts the definitions presented in Table 1 in relation to AI.	The use of AI in Sport and Exercise Sciences (SES) should be guided by the values, commitments and behaviours alongside those of the Department and Education Provider	BASES members should support each other and share best practice to help the profession and scientfic discipline maximise the benefits of AI and minimise its risks.	Local, institutional level policies and guidelines related to AI should be grounded in an understanding of the actual capabilities of AI.
BASES cautions great care when determining if it is possible to detect AI-generated text in student assignments with the level of confidence necessary to accuse a student of plagiarism.	Investment decisions and strategic developments in SES should be informed by reasonably foreseeable developments in AI.	BASES adopts the definitions presented in Table 2 in relation to assessment.	At the core of SES, education and assessment are people whose interests, interactions and relationships should be enhanced, not diminished, by AI. All applications of AI should have as their primary objective the improvement of the human condition.
BASES considers that adopting and integrating AI tools within teaching is a positive step that will equip students with future work based skills that will enhance their learning and professional and practical digital skills development.	Integrating AI into the operation of SES Departments offers several opportunities to enable students to excel.	Generative AI should become another tool that we equip our students with as long as they also understand the responsible use of such tools.	AI needs to be used ethically and responsibly and students need to be helped to learn how to do this
	The roll out of AI across the sector needs to be accompanied by a research endeavour of comparable size to assess if the use of AI is benefiting students and society at large.		

The following word cloud illustrates the content of this document to help potential readers identify if it contains material that they might find useful.

INTRODUCTION

This Position Stand (PS) is aimed at a broad readership including –

- ✓ Heads of Sport and Exercise Science Departments in FE and HE.
- ✓ Academics who assess students.
- ✓ External Examiners and those responsible for quality and academic standards.
- ✓ Students.
- ✓ Sport and Exercise Scientists, like the authors, who are asking the question 'what will be the short-, medium- and long-term impact of AI on our profession and scientific discipline?'

Accordingly, the purposes of this stand are to –

1. Recognise that, at the time of writing that the impact of AI on Sport and Exercise Sciences (SES) is just beginning to be felt and that the immediate and longer-term impacts are likely to be i) profound and ii) unpredictable. The authors have approached the drafting of this PS with a sense of humility in the knowledge that their expertise and powers of prophecy are limited and in the hope that this document will lead to more work in this area.
2. Recognise that readers will have differing degrees of familiarity with, and experience of using AI.
3. Let readers know how they can volunteer to support colleagues across the BASES community adapt to the impact of AI.
4. Provide a resource that references a bibliography which readers can use to enhance their own practice in this area.
5. The purpose of part 1 of this PS is to begin to address the Association's general position on AI across the profession and scientific discipline.
6. The purpose of part 2 of this PS is to offer guidance on how the opportunities presented by AI to assess students of SES might best be seized and the risks minimised.

It is envisaged that this PS will be the first but not the last resource that the Association will produce on AI. It is likely that there will be the need i) to update this document at regular intervals, ii) draft additional PS with a focus on areas other than assessment and iii) develop training and development resources including webinars.

PART 1: ARTIFICIAL INTELLIGENCE

Summary: This section defines machine learning, AI, Artificial General Intelligence, Generative AI and Large Language Models. The history of AI is illustrated from 1964 onwards. It is suggested that the use of AI should be guided by the BASES values, commitments and behaviours. This part of the Position Stand also suggests how Sport and Exercise Scientists can support each other and share best practice to help the profession and scientific discipline maximise the benefits of AI and minimise its risks. In addition, this section identifies i) the current capabilities of AI and ii) how AI might develop in the future.

DEFINITIONS AND HISTORY

The purpose of this part of the PS is to begin to address the Association's general position on AI across the profession and scientific discipline. This section of the PS is applicable to a range of SES settings and topics.

Position #1: BASES adopts the following definitions in relation to AI.

TERM	DEFINITION
Machine Learning	Machine learning (ML), a subset of artificial intelligence, involves equipping computers with a general learning algorithm that allows them to discover patterns and relationships in data and improve over time, eliminating the need for programmers to write specific rules for each dataset (Wikipedia contributors, 2023d). The advent of ML has significantly transformed practitioners' ability to understand, interact with, and make decisions based on data (Rouse, 2023a). ML includes methods like Neural Networks, Support Vector Machines, and Random Forests (Van Eetvelde et al., 2021).
Artificial Intelligence	Artificial Intelligence (AI) is a field that aims to develop systems capable of executing tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation (Wikipedia contributors, 2023b). These systems are designed to mimic human-like intelligence, demonstrating the ability to think, learn, and adapt over time (L. Chen et al., 2020; Wikipedia contributors, 2023b). AI has been defined by its ability to solve complex problems for one specific task, learning relevant patterns in the data in a particular set of circumstances (Russell & Norvig, 2016). However, the level of generality is changing as large language models become more general-purpose.
Artificial General Intelligence	Artificial General Intelligence (AGI) is the long-term goal of creating systems capable of understanding, learning, and applying knowledge across a wide range of tasks that would normally require human intelligence (Grossman, 2022; Wikipedia contributors, 2023a). AGI is characterized by its ability to reason, use strategy, solve puzzles, make judgments under uncertainty, represent knowledge, plan, learn, and communicate in natural language (Russell & Norvig, 2016). This means in the future AGI could potentially perform any intellectual task that a human being can (Jordan, 2019; Wikipedia contributors, 2023a).
Generative Artificial Intelligence	Generative AI models are capable of generating text, images and other media in response to user prompts (Z. Chen et al., 2022). The models learn patterns and structure in their training data and use that knowledge to generate new synthetic data with similar characteristics (Goodfellow et al., 2014; Lawton, 2023). Notable examples include ChatGPT from OpenAI and Bard from Google, which generate natural language and Midjourney and DALL-E, which create images to user prescriptions.
Large Language Models	Large Language Models (LLMs) are capable of processing natural language tasks (Rouse, 2023b). LLMs are trained on vast amounts of text data, from which they learn patterns and relationships within language (Kerner, 2023; Rouse, 2023b). The training objective is to predict the next

	word in a sequence, much like an advanced version of the autocomplete feature used in texting. To do this effectively, LLMs must form an implicit model of the complex web of relationships between words, ideas, concepts, and of the subtleties of language, intention and meaning within the appropriate context (Lee, 2023). To its human interlocutor, the LLM appears to 'understand', although the model works in an entirely different way to the human brain.

Table 1: Definitions of AI Related Terms

To put AI into it historical and cultural context the figure below presents a timeline of the key moments in its development to date.

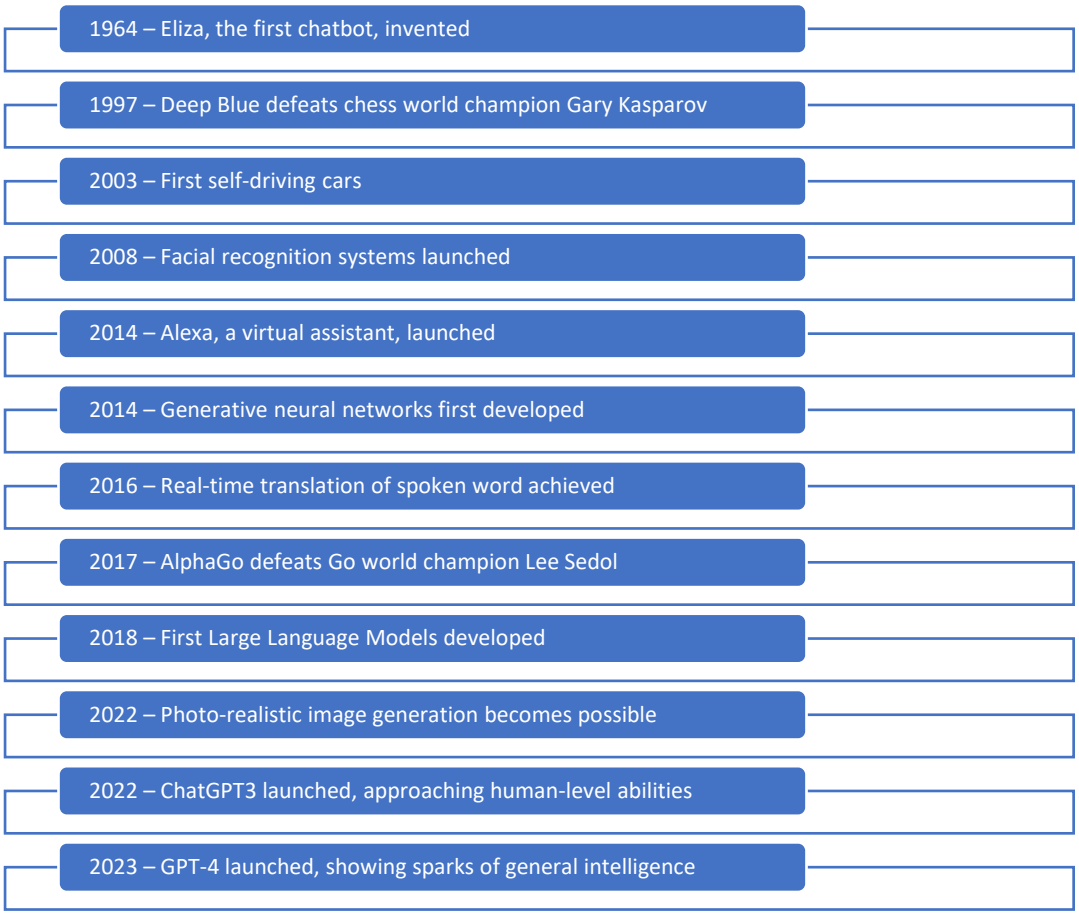

Figure 1 – A simplified timeline of the development of recent Artificial Intelligence, edited for the milestones that led toward large language models (Bubeck et al., 2023; Wikipedia contributors, 2023c; Wooldridge, 2021).

BASES' VALUES AND AI

Position #2: The use of AI in SES should be guided by the BASES values, commitments and behaviours illustrated below alongside those of the relevant Department and Education

Provider.

The following comments are intended as short illustrations of how these values might be applied. Readers are directed to the BASES website for more information on these values, behaviours and commitments and encouraged to reflect on how best to apply them in their individual and institutional circumstances.

Fairness: Equitable access to AI's transformative capabilities is vital. Institutions provide the tools and foundational resources, but it is up to individuals to make the most of this technology. Educators should communicate clearly the risks associated with AI, and institutions should collaboratively address them. Our stance is that training data should encompass a wide array of voices, going beyond those of a privileged few.

Professionalism: Professional human oversight of the application of AI in SES is a prerequisite to ensure that it is used is in accordance with the Association's values.

Honesty: The use of AI tools in academic work brings both promise and responsibility. While these tools can be invaluable aids, it's essential that those who use them (e.g. students) acknowledge how they used them and ensure that they are used in such a way as to avoid academic malpractice (e.g., plagiarism). To enable this, appropriate use of AI training and clear guidance is needed for students, academics and other users.

Responsibility: The integration of AI tools within SES necessitates clear lines of human accountability. Regardless of the extent of AI assistance in research, articles, or other outputs, a designated individual must always stand as the ultimate authority and be answerable for the content and its direct consequences.

Excellence: AI can serve as a helpful digital assistant to Sport and Exercise Scientists, elevating their capabilities in professional practice, research, and teaching. By leveraging AI in the right manner, we can enhance the quality of our scientific work and the professional services we provide.

SUPPORTING EACH OTHER TO ADAPT TO AI

Position #3: BASES members should support each other and share best practice to help the profession and scientific discipline maximise the benefits of AI and minimise its risks.

Members can achieve this by, for example:

1. Submitting pieces on AI for consideration by the Sport and Exercise Scientist (TSES). For information on how to do this please see here.
2. If they have developed a specific and demonstrable expertise in AI, apply for funding and support from BASES to draft an Expert Statement. For information on how to do this please see here.
3. If they want to help others by directing members to resources and/or research, they can contact BASES CEO, Ian Wilson (iwilson@bases.org.uk) to discuss how this might be achieved through a mailout or inclusion in the BASES newsletter.

The Association provides several platforms (for example, TSES) where members can debate AI as it relates to SES. As the development of good policy and practice requires freedom of speech and open debate, colleagues are encouraged to use these platforms to share their thoughts and experiences.

AI CAPABILITIES@2023[1]

Position #4: Local, institutional level policies and guidelines related to AI should be grounded in an understanding of the actual capabilities of AI.

It is important when forming a position on AI at any level to ensure that it is informed by what AI can and cannot do. Evidence based policy is required if society is to maximise the benefits of AI whilst mitigating the risks.

The advent of ChatGPT in late 2022 was a seminal moment in the development of AI. This model, characterised by its ability to engage in fluent, human-like conversations and perform diverse writing tasks, sparked a wave of excitement and concern about the possible role of such AI in education, particularly in the realm of assisting students with writing and reasoning (Villasenor, 2023).

ChatGPT is part of a class of technologies known as large language models (LLMs) that boast a variety of capabilities, each dependent on their unique training data and architecture (Zhong et al., 2023). The application of such models in academic settings reveals distinct strengths in tasks like clearly explaining concepts. Models like ChatGPT perform language tasks at a level that is at least equal to, if not slightly above, the average human being, but it still trails behind the capabilities of top human experts (Zhong et al., 2023). ChatGPT exhibits proficiency in tasks such as explaining concepts, expressing causality, and crafting narratives grounded in common sense, but stumbles when faced with complex logical reasoning and mathematical problems (Centre for Teaching and Learning, 2023; Lightman et al., 2023; Suzgun et al., 2022). Simple prompting techniques can enhance the model's performance still further, such as asking it to think “step by step” or to reflect on its answers and thereby correct its own mistakes (Lightman et al., 2023).

Although the performance of ChatGPT and other top-ranked LLMs is impressive, they still exhibit manifest failings. It is known that ChatGPT may confidently make plausible assertions that turn out to be false. The model does so when encountering gaps in its knowledge (limited training data concerning the topic in question), a behaviour known as hallucination (Zhang et al., 2023). LLMs may sometimes struggle with logical reasoning or falter in tests of critical thinking (theory of mind) and in complex multi-stage tasks (Centre for Teaching and Learning, 2023; Lightman et al., 2023; Suzgun et al., 2022; Ullman, 2023; Wang et al., 2023). They also display biases present in their training data and may provide differing responses based on demographic groups mentioned in prompts (Wang et al., 2023). Nevertheless, the field is continuously evolving, with ongoing research aiming to address these weaknesses (Wang et al., 2023; Zhang et al., 2023).

So, where do we stand now in terms of LLM applications in education? LLMs currently exhibit capabilities that can assist students in writing and reasoning tasks relevant to learning. Indeed, one of their strengths is their ability to explain complex concepts to students, who can then ask questions and check their understanding in a manner not unlike having a one-to-one meeting with a lecturer, but one where their tutor tries to be helpful with infinite patience, allowing them to ask any question without fear of shame or embarrassment. Although the student may have access to knowledge on an unprecedented scale, that expertise is not always reliable or trustworthy. Therefore, significant

[1] This section was written with the assistance of LLMs. Claude 2 helped to summarise papers (e.g. https://shareclaude.top/c/cvfzxcu) identified by one of us (White). The AI then produced drafts of the text under close supervision by White, who instructed the model in detail, including directing the AI on the themes required (https://shareclaude.top/c/xchierw, https://shareclaude.top/c/husegsf). After several iterations, GPT-4 was instructed to polish the wording (https://chat.openai.com/share/a89dfc44-8be7-42d2-9968-c5a15012bb96). The text went through further human revisions. The final version here departs from the AI-generated version. The links give full transparency of the writing process. As is evident from the conversation, a considerable amount of human effort was made to control the AI to produce the desired outcome. It is questionable whether with so much work using an AI was worth it.

instructor guidance and oversight are necessary to ensure appropriate usage and prevent over-reliance. As the technology continues to evolve rapidly, any projection of its future development trajectory must carefully balance the current strengths and limitations. We need to focus education more on how to interpret and critique rather than to gather and retain information.

Methods for reliably detecting AI-generated text showed early promise and include techniques such as introducing a watermark, developing classifiers based on statistical measures and training neural networks to identify text generated by an LLM (Desaire et al., 2023; Kirchenbauer et al., 2023). However, subsequent, more rigorous analysis shows these techniques fail when paraphrasing the AI-generated text while retaining its fluency and meaning. Watermarking accuracy can decrease from 97% to 15%, statistical classifiers from 96% to 25%, and neural networks also experience significant declines (Sadasivan et al., 2023). As LLMs advance further, producing more human-like text, reliable detection will become even more difficult, possibly making the problem of detecting AI-generated text unsolvable (Sadasivan et al., 2023). Nevertheless, the major AI companies have committed themselves publicly to developing a more sophisticated watermarking technology that might evade these so-called paraphrasing attacks (The White House, 2023).

POSITION #5: BASES cautions that great care should be taken when determining if it is possible to detect AI-generated text in student assignments with the level of confidence necessary to accuse a student of plagiarism.

More rigorous, independent testing and fundamental innovation in detection algorithms will be critical before considering deployment in academic settings. It is quite likely that LLMs are already being heavily used within essay mills, aided by relatively expert editing by the essay mills' teams. We observe that the paraphraser tools currently available produce text that is in our opinion notably inferior to the original text, even though the statistical measures of text fluency may indicate only a marginal reduction. The substitution of words and phrases does subtly change the meaning or emphasis in many instances in own tests (White, 2023) Paraphraser technology will doubtless also improve, but it may not offer the path to an A-grade. Students may wish to consider whether using LLMs is worth it, considering the extra work they may have to do to avoid charges of plagiarism compared to the work required the learn the material and produce the required assessment.

THE FUTURE

POSITION #6: Investment decisions and strategic developments in SES should be informed by reasonably foreseeable developments in AI.

The heads of the leading AI labs, Open AI, Google Deep Mind and Anthropic predict rapid advancement in LLMs capabilities in the coming years (Collison, 2023; Future of Life Institute, 2023; Hassabis, 2023). This includes gains from scaling up model parameters and data, which could bolster skills relevant to learning, such as causal reasoning or evaluating arguments. However, these advancements will not come from AI's merely "reading more books". Fundamental changes in approaches, such as reinforcement learning from human feedback and making large models more efficient, will be pivotal to continued progress (Collison, 2023; Constantin, 2023; Future of Life Institute, 2023; Gunasekar et al., 2023).

Key issues remain such as accuracy, reasoning, and task comprehension, that continue to pose significant barriers. It is imperative to address these issues for the beneficial application of LLMs in education (Knight, 2023; Suzgun et al., 2022; Wang et al., 2023; Zhang et al., 2023). Lastly, there is also the looming possibility of superintelligence emerging before this decade is out, a concept that possesses both immense transformative potential and substantial risks (Altman et al., 2023; Leike & Sutskever, 2023). Ensuring the safe development and alignment of any potential superintelligent systems with human values is of the utmost importance (Altman et al., 2023; Hassabis, 2023; Leike & Sutskever, 2023). Hence the importance of position statement # 6.

While rapid advancements in large LLMs are on the horizon, realising their full potential depends on concentrated innovation in data handling, algorithm refinement, and above all, safety mechanisms.

How these challenges are tackled will significantly shape the future role of LLMs in education and their broader societal impacts.

PART 2: AI AND ASSESSMENT

Summary: This part defines Summative, Formative, Authentic, Self & Peer and Inclusive Assessment. AI in HE is contextualised in relation to valuing humans, personalised learning & support, and curriculum assessment. Thoughts are provided on the ethical and responsible use of AI. Observations are also made on future research that is needed in this area.

The purpose of this part of the PS is to specifically offer guidance on how the opportunities presented by AI to assess SES students might best be seized and the risks minimised.

In offering this guidance, BASES is keen to recognise and reinforce the independence and autonomy of Colleges and Universities. It is for these Institutions and the academics within them to decide what best aligns with their mission and the needs of their students.

Position #7: BASES adopts the following definitions in relation to assessment.

TERM	DEFINITION
Summative Assessment (SA)	Summative Assessment is a high-stakes assessment that is usually formal and evaluates students' attainment of the learning outcomes using established criteria, usually cumulative and delivered at the end of a block of the curriculum (Dixson & Worrell, 2016). It is an important element of the programme to illustrate that students have met standards of knowledge and competencies required by employers or professional bodies (Pitt & Quinlan, 2022).
Formative Assessment (FA)	Formative Assessment is a planned low-stakes assessment that enables a teacher to modify the learning experience and enables students to assess their own learning and learning strategies (see Pitt & Quinlan, 2022). The assessment can be self-administered outside of normal assessment periods, if desired, or it can be conducted as part of a teaching session. Either way, it has the potential to influence teaching as well as inform students about their learning (Ismail et al., 2022).
Authentic Assessment	Authentic Assessment tasks are designed to replicate real-world scenarios and work-related performance criteria. This approach has been found to benefit student learning, autonomy, motivation, self-regulation, and metacognition (Villarroel et al., 2017). There is a clear link to employability or graduate attributes (Ashford-Rowe et al., 2013).
Self and Peer Assessment	Self-assessment involves a variety of approaches that incorporate assessment of one's own functioning. This involves analysing qualities of one's own work and possibly assigning worth (marks) to it (Andrade, 2019; Pandero et al., 2016). Peer assessment is an arrangement in which individuals consider the quality of the products or outcomes of learning of peers of similar status (Topping, 1998).
Inclusive Assessment	Inclusive Assessment refers to use of diverse assessments that provide multiple ways for students to represent their knowledge and reduce the need for individual accommodations (Nieminen, 2022). It offers a more contemporary social perspective. Historically, medical models of disabilities have led to the idea of designing assessment practices that enable all students to demonstrate knowledge to their full potential (Hockings, 2010).

Table 2: Definitions of Terms Related to Assessment

THE CONTEXT OF AI AND ASSESSMENT IN HIGHER EDUCATION (HE)

AI is already embedded in systems and processes in HE. Examples include monitoring student attendance and their engagement with online learning and assessment. The following position

statements centre on the opportunities presented by the current discourse on AI in HE. Colleagues may wish to reflect on how AI can be used to enhance professional practice in teaching and learning and in supporting students in achieving excellence.

Valuing Humans: Adapting to and keeping up with the advancements in AI and the challenges and opportunities it brings to teaching, learning and assessment will be key for future integrity and success. However, sport and exercise science is a relational field and largely dependent on human-to-human interaction. As educators we must focus on the strengths within our multidisciplinary field in teaching, learning and assessment to prepare graduates for employment in a fast-changing world, driven increasingly by AI.

Direct contact time with teaching staff has been cited as the most important determinant of student satisfaction for both Undergraduate (UG) and Postgraduate (PG) students (Sutherland et al., 2019), alongside approachability, empathy, and sensitivity (Hadad et al., 2020). Educational research supports the importance of relational pedagogy (Bell, 2022). AI cannot substitute the genuine human connection made with students and the individual response based on personal, social, cultural, and economic sensitivities afforded to maximise their experience, progression and success.

Human educators can respond to individual-, group- and cohort needs in real-time. For example, within a presentation, Lecturers can adjust their style to help students maintain their focus, or in seminars, they can shape the discussion. Lecturers can make in-module changes to address student feedback or understanding, or in-programme work to create a holistic environment of support to cater for a diverse cohort. We can respond to data analytics whilst considering social and cultural needs of our individual learning environments to ensure our graduates can think critically and respond to complex problems in a rapidly changing world. LLM can complement these human interactions by helping students learn to think critically by interrogating models and exploring concepts, thereby helping the learner gain a deep understanding. They can do so in their own risk-free environment where any question can be asked to an AI tutor with infinite patience and a willingness to help.

The demands of the workplace are changing quickly. Developing an individual's collaborative and cognitive skills, such as problem solving, alongside technical abilities will be key to future success in the workplace (UKCES, 2014). Students and practitioners should be provided with many and varied opportunities to develop human-to-human interpersonal skills to navigate challenges in the workplace (Alfano & Collins, 2023), as outlined by BASES in the BASES Undergraduate Endorsement Scheme criteria. This may include authentic assessment tasks, reflecting on patient participation groups, or discussing testing protocols with athletes. Arguably nothing can replace human perception and instinct when reading facial or body language changes during interviews or analysing the shift in focus of a cohort when delivering a lecture.

There is a clear need to incorporate teaching and learning activities on the beneficial but moral use of AI (Sullivan et al., 2023) alongside assessable authentic activities (Villarroel et al., 2018) which draw on human contact and intuition. Aside presentations, viva voces, Objective Structured Clinical Examinations (OSCE) and practical interactions, tasks which include argumentation, discussion, and interdisciplinary collaboration to innovate creative solutions to problems will benefit critical thinking and problem solving (Rahmam, 2019). Tasks with high contextual demands, such as case studies specific to an individual, environment and place will presently limit the usefulness of AI and provide exceptional student challenge. Tasks with case sensitivities (such as moral, ethical, or cultural encounters) and work-based learning and capstone projects will also at present provide an exceptional student challenge.

AI may bring many benefits to personalised education and teacher efficiency. However, it will not replace the role of the sport and exercise scientist as an educator, although the nature of the role will change. The human touch, intuition, compassion, creativity, and interdisciplinary experience will remain essential in developing i) relationships with students & clients and ii) graduates prepared to enter the workforce with a well-rounded skill set equipped to solve real-world problems.

Position #8: At the core of sport, exercise, science, education, and assessment are people whose interests, interactions and relationships should be enhanced not diminished by AI. All

applications of AI should have as their primary objective the improvement of the human condition.

The next three elements of this PS focus on assessment viewed from a broad perspective. Here AI may best be seen as an opportunity to improve the student experience and graduate outcomes rather than as a problem to be solved.

1. ***Personalised Learning:*** The use of machine learning based platforms that can personalise learning does not replace the human teacher but has the potential to enhance our effectiveness in supporting learners individually. It can also improve the overall learning experience that we deliver. A personalised learning package can provide students with immediate, real-time formative feedback as they learn (Hooda et al., 2022) and can tailor individual student learning based on students' needs and interests (L. Chen et al., 2020). Content can be filtered to encourage students to review areas where they lack understanding. LLMs can probe students' responses until they demonstrate learning to facilitate a greater depth of understanding. With inclusivity in mind, such platforms could tailor worked examples and case studies to match student profiles and interests to avoid skewed illustrations that might alienate or fail to resonate with all students.

   At a cohort and module level, data analytics of students' engagement with these online packages can identify i) common mistakes, ii) areas that are challenging or avoided by students and iii) those which are being easily learnt (L. Chen et al., 2020). These insights can be used to make decisions about what, if anything, we need to modify in either our ongoing teaching and curriculum or in subsequent iterations of a module. By following these steps, we can enhance student learning and success.

2. ***Personalised Support:*** Large numbers of students studying sport-related subjects can be viewed positively for the profession and discipline. However, big cohorts can make providing personalised support for students a challenge. Some colleagues have found that the traditional personal tutor model difficult to follow in the implement when dealing with large cohorts. Developing personalised learning plans based on profiles is potentially valuable but can be complex and time-consuming for some tutors. These plans can be extensive and made up of many elements including, for example, students' i) learning needs, ii) online behaviours & patterns of study iii) grades, iv) attendance and v) assessment feedback. AI platforms can help tutors provide personalised support as such platforms can make use of data analytics and machine learning to develop individualised support suggestions for students based on their learner profiles (L. Chen et al., 2020). In addition, Chatbots can pose questions to students and vice versa, to generate personal study plans, to identify potential career aspirations and develop plans to pursue these (L. Chen et al., 2020; Hooda et al., 2022). This use of AI can empower students and add value to face-to-face personal tutor meetings.

Position #9: BASES considers that adopting and integrating AI tools within teaching is a positive step that will equip students with future work-based skills that will enhance their learning and professional and practical digital skills development.

In responding to this position statement, care needs to be taken to ensure that AI is used as part of a wider assessment strategy that does not forego human-human interaction and the developments of "soft" skills.

3. ***Curriculum Assessment:*** From a teaching perspective, it is imperative that we assess students appropriately and that our assessments have relevance. Checking, challenging, and enhancing this is a key part of Quality Assurance. Zaki et al. (2023) explored the use of AI in this process, using AI natural language processing to map module and programme learning outcomes. They concluded that, whilst not 100% accurate, AI can conduct efficient, objective, and consistent mapping of these learning outcomes. The incomplete and inaccurate mapping can be developmental as it presents an impetus to reflect on the suitability, consistency and comparability of learning outcomes and verbs that are used across the programme. Such a

mapping provides a framework for assessing student learning, ensuring the curriculum encourages students to develop industry and discipline relevant skills, as well as the appropriate skills and knowledge in accordance with the overall programme aims. From a leadership perspective, data-driven AI based decision making offers a way to assess a department's provision based on factors such as enrolments, withdrawals, and graduation outcomes (Teng et al., 2023). This enables decisions to be made about which programmes to develop or withdraw using objective data to better secure the sustainability of Sport and Exercise Science departments.

Position #10: Integrating AI into the operation of SES Departments offers several opportunities to enable students to excel.

THE ETHICAL AND RESPONSIBLE USE OF AI IN HE

An immediate reaction to the release of the advanced LLM GTP4 was how students could utilise it to write assignments for them that could pass the assessment criteria (Gilson et al., 2022) thereby potentially compromising academic integrity. However, should the use of AI be considered cheating? If a student asks a generative AI or LLM a prompt and then copies the response into an assessment verbatim, then yes this should be considered academic misconduct. Much in the same way that a student copying information from Wikipedia or presenting writing from a journal article would be considered plagiarism. Use of essay mills to write an assessment is classed as contract cheating (Sweeney, 2023) and is most analogous to the use of AI for academic malpractice. These challenges academics have faced for many years and as educators we devote time to teaching students the correct way to research and cite information.

Position #11: Generative AI should become another tool that we equip our students with as long as they also understand the responsible use of such tools.

This following four points present material on how this might be achieved.

1. ***Explain the ethical and moral use of AI:*** Use of AI by students to cheat on assignments results in academic misconduct (Stokel-Walker, 2022). As students are not producing original work or assessing their own knowledge and understanding. They are also not engaged with the learning process. Academics have questioned how much AI generated content is acceptable in research articles (Anderson et al., 2023) and the same can be applied to learning and teaching content and student work. If we are able to recognise a student's own work and when this is different or improved through the use of AI, it can be flagged for further investigation. These issues can be raised and discussed in advance of them happening with students so that they can acknowledge and appreciate the problems associated with using AI, how this relates to institutional academic misconduct guidelines, and the implications of using AI to cheat and the risk to their academic success.

2. ***How can students use AI responsibly:*** While there is a fear that introducing generative AI formally in teaching to students will increase the likelihood that students will use the technology in a dishonest manner, BASES proposes that overtly demonstrating to students how to responsibly use AI within classes to aid their learning will create an environment that deters cheating (Noorbehbahani et al., 2022). Examples of this may include identifying or summarising key themes or information within an in-class topic and reflect on their learning, generating research project topics for dissertations or interrogating existing evidence (Keiper et al., 2023), asking students to ask AI for feedback on assignment drafts (Kasneci et al., 2023), or analyse their writing style and quality (Naidu & Sevnarayan, 2023). Using AI to provide feedback can potentially improve the performance of academics and students. Students can also use AI to assist in practical scenarios, as we can ask them to use the tools to identify and describe test protocols to improve student confidence in their application when in the laboratory or field and reflect on how AI may have assisted them.

3. ***How can academics adopt AI and teach students to use it responsibly:*** We should consider ways in which we can integrate AI as a learning tool within class to benefit our

teaching. Examples of this include asking students to use AI to solve problems, summarise a journal article or check the reliability of the sources that the AI has included, as highlighted as an issue in AI generated research in sports medicine (Anderson et al., 2023). Rather than fearing students will copy AI generated answers, we can instruct students to compare AI generated test answers to assigned template answers to identify the differences in depth and quality of results generated. This is useful in highlighting issues and potential biases that exist, the concern that accepting AI outputs at face value is problematic, and to guide students to verify the quality and accuracy of the AI model's output.

4. ***Responsible Use, Decolonisation of Technology, and Culture, Equity, Diversity and Inclusion in the use of AI:*** There are emerging frameworks that aim to guide the process of including responsible use of AI in teaching and learning and ensure this is done in an inclusive manner. Bentley et al. (2023/working paper) are proposing a framework for responsible AI education based on the UKRI and EPSRC's AREA framework (2023) that recognises the importance of responsible research and innovation (RRI). They suggest that AI education should i) promote social justice and equity, ii) prioritise dialogue and participation, iii) adopt an inquiry-based approach, iv) encourage reflection and action, and v) contextualise AI. Overall, these five pillars encourage students and educators to appreciate the unequal access and impact AI is likely to have on a global scale and acknowledge historical factors such as colonialism that are likely to affect this. BASES' students and teachers need to understand that they are likely to have access to and opportunities to benefit from AI earlier than others and equity in access and ability to use AI is required for inclusive education. Teaching should include meaningful discussions about assumptions underpinning AI discourse, encourage students to engage in tackling meaningful and complex problems rather than simplified scenarios, act for positive change based on their learnings, and understand AI in relation real world issues and the contexts in which they operate. If these, or other conditions are met it is possible that LLMs could democratise knowledge on an unprecedented scale making it accessible to everyone across the world. Citizens of the world could have subject matter expertise at their fingertips with consequential gains in productivity and capability. With the right leadership and correct implementation, the AI revolution could narrow the gap between richer and poorer parts of the world.

Position #12: AI needs to be used ethically and responsibly and students need to be helped to learn how to do this.

SUGGESTED RESEARCH

Based, in part, on our own experience drafting this Position Stand, we are of the view that more research is needed in this area. This work could, for example, explore:

- ✓ The AI related skills that employers want from SES graduates.
- ✓ The AI tools that self-employed and entrepreneur SES graduates will need to use.
- ✓ How AI can help improve the retention of SES students.

Position #13: The roll out of AI across the sector needs to be accompanied by a research endeavour of comparable size to assess if the use of AI is benefiting students and society at large.

CONCLUSION

Embracing AI and integrating it into optimal human-AI learning environments requires the investment of time and money. This investment is needed both to put in place the infrastructure needed to run state of the art AI systems and to train staff in their usage. Alongside this financial investment, a culture needs to be created in which partnership working between staff across different roles and between staff and students is encouraged. If the SES community works together, it can use the

benefits of AI to sustain the discipline and ensure it remains a current, excellent and a compelling choice for high quality students and future scientists.

BASES is committed to working with its members to help achieve the benefits of AI whilst mitigating its risks. To that end, the Association will offer new guidance when possible and offer webinars and other training opportunities on AI.

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PLEASE NOTE THAT THIS POSITION STAND IS FOR GUIDANCE ONLY. FURTHER INDEPENDENT LEGAL GUIDANCE SHOULD ALWAYS BE SOUGHT IF NECESSARY.

AI IS CONSTANTLY CHANGING AND THERE ARE CHANGES AND UPDATES ALMOST DAILY WHICH SHOULD BE MONITORED AND ACTED UPON BY ALL SPORT AND EXERCISE SCIENTISTS

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