

Unit 5: Research Project in Sport and Exercise Sciences

| | |
|-------------------------------|----------------------|
| Unit code: | T/600/0042 |
| QCF Level 3: | BTEC National |
| Credit value: | 10 |
| Guided learning hours: | 60 |

● Aim and purpose

The aim of this unit is for the learner to produce a sport or exercise science-based research project applying accepted academic conventions for project design.

● Unit introduction

Consider the following questions: Why do people take part in sport? Why do some people not take part in exercise? How does a talented athlete become an elite athlete?

These are just some of the questions that have been asked and answered through sport or exercise science-based research. The sport and exercise scientist can apply research techniques to systematically solve problems through the development of research hypotheses.

The research work of sport and exercise scientists involves planning, data collection, data analysis, communicating research findings with others and using key aspects of reflective practice to evaluate the research undertaken.

This unit gives learners the opportunity to complete a project that can be seen as the culmination of their programme of study. It allows them to investigate an area of their choosing from within the sport and exercise sciences. This unit should be taken after significant prior study on the programme in order to allow learners to make an informed decision regarding their choice of project.

The unit follows a simple 'plan, do, review' format, with the focus on the development of a range of skills within the research process. Learners should be encouraged to use relevant information computer technology, and to identify and use a range of resources, in order to carry out their practical investigation effectively. Learners will effectively collect data, ensuring due regard for ethical and legal considerations, analyse data, and produce a research report that follows accepted guidelines.

In order to successfully complete this unit, learners will need to draw on knowledge, understanding and skills gained through this and other units, and transfer these to a practically-based research situation.

● Learning outcomes

On completion of this unit a learner should:

- 1 Be able to plan a sport science- or exercise science-based research project
- 2 Be able to conduct a sport science- or exercise science-based research project
- 3 Be able to produce a sport science- or exercise science-based research project
- 4 Be able to review a sport science- or exercise science-based research project.

Unit content

1 Be able to plan a sport science- or exercise science-based research project

Plan: focus; title; aims; objectives; scope; research design; sample; data collection; data analysis; ethical considerations; legal considerations; validity and reliability considerations

2 Be able to conduct a sport science- or exercise science-based research project

Resources: resources needed; considerations, eg availability, booking, arranging, familiarity of researcher with techniques, familiarity of researcher with equipment; recording thoughts and feelings regarding the research process

Ethical and legal issues: informed consent and confidentiality; health screening; data protection; ensuring the welfare and safety of the client throughout the research process, eg child protection, CRB checking, knowledge of operating equipment, ethical clearance for the project

Data: collecting, eg precision, field-based, laboratory-based, use of spreadsheets or databases, interviews, questionnaires, surveys, participant observation; recording, eg rank order, frequency, cumulative frequency, range, transcribing, audio recording, video recording; use of ICT; storage, eg secure storage; analysis, eg opportunity to conduct manual data analysis, qualitative analysis, quantitative analysis, making initial conclusions regarding analysed data

3 Be able to produce a sport science- or exercise science-based research project

Scientific structure of the research report: title page; abstract; general contents page; contents page for figures and tables; contents page for appendices; acknowledgements; introduction; literature review; method; results; discussion and conclusion; references section, eg Harvard; appendices; coherent and well-structured research report; use of ICT

4 Be able to review a sport science- or exercise science-based research project

Review: how well did project conclusions meet project aims; strengths and areas for improvement; evidence; specific examples

Future recommendations: if the project was to be completed again, what would be changed with the project and why; benefits of suggested changes; proposals for further research

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | | |
|---|---|---|
| To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
| P1 plan a sport science or exercise science-based research project [IE1, IE2, CT1, SM3] | M1 explain how the selected research design and research methods will ensure that data collection and analysis is valid and reliable | |
| P2 carry out sport science or exercise science-based research [IE2, IE3, SM2, SM3] | | |
| P3 collect and record data from the research project conducted | M2 correctly analyse collected data, describing techniques used | D1 correctly analyse data, explaining techniques used |
| P4 produce a full research report using a standard scientific structure [IE4, IE6] | | |
| P5 carry out a review of the research project conducted, describing strengths, areas for improvement and future recommendations. [RL3, RL5] | M3 carry out a review of the research project, explaining strengths, areas for improvement and future recommendations. | D2 carry out a review of the research project, justifying future recommendations for further research. |

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

| | | | |
|------------|--|---|--|
| Key | IE – independent enquirers CT – creative thinkers | RL – reflective learners TW – team workers | SM – self-managers EP – effective participators |
|------------|--|---|--|

Essential guidance for tutors

Delivery

This unit gives learners the opportunity to conduct a dissertation-style project into an area of personal interest within the sport and exercise sciences. Learners should investigate a topic that is within their capabilities, is of their choosing and is based on relevant knowledge, skills and understanding gained through other units in the qualification. Therefore, this unit should be delivered after learners have had sufficient opportunity to develop a range of interests and knowledge within the sport and exercise sciences.

Delivery should concentrate on developing the skills of planning, doing, disseminating and evaluating research. This should allow learners to apply their understanding of research methods to a practical situation. If learners have not fully developed this understanding, it may be useful to re-visit the key aspects of *Unit 4: Research Methods for Sport and Exercise Sciences*.

It is essential that learners plan, conduct, disseminate and evaluate the research project within a structured and logical framework. Tutors should emphasise that the skills developed through completion of the research project, for example time management, communication, reflective practice and ICT, are transferable to other contexts, including higher education and the workplace.

Learners will need advice and guidance for the more technical aspects of the unit, such as producing a complete research report in a clear and appropriately structured format, the correct application of the Harvard referencing system and using, as opposed to simply reading, literature from appropriate sources.

Teaching and learning strategies should incorporate a number of methods and activities, drawing on a variety of resources to introduce learners to the range of practices within the research process. Learners should develop knowledge, skills and understanding through a combination of independent research, research project workshops and the use of research supervisors. It is recommended that the more technical aspects are delivered directly through tutor input.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

| Topic and suggested assignments/activities and/assessment |
|---|
| Introduction and overview of the unit. |
| Assignment 1: Project Proposal (P1, M1). Tutor introduces the assignment brief. |
| Outline scientific structure of report – present previous, or published examples from sport and exercise sciences for classroom discussion and debate. |
| Define parameters of project in terms of scope and resources – classroom discussions, literature search. |
| Formulate hypotheses in small groups of similar research focus eg sport psychology. Small group discussions and debate. |
| Experimental design workshops – tutor-led discussion covering research design and learner activities in small groups. |
| Assignment 2: Research Project (P2, P3, M2, D1). Tutor introduces the assignment brief. |
| Individual planning meetings to discuss and approve the study (tutor guidance) and to define timescales, resources etc. Includes time allocated for learners' independent research. |
| Learner practical experiments and data collection (possibly remote). |
| Revision of acceptable format for report presentation, reminder of necessary data analysis: classroom discussion, case-study referral. |
| Assignment 3: Final Report (P4, P5, M3, D2). Tutor introduces the assignment brief. |
| Present the whole project as an individual to the group – classroom discussion. |
| Review the project: learners formulate an evaluation and present recommendations for improvement. |
| Evaluation of unit and assessment. |

Assessment

The topics of research must be selected by learners and the project must involve the application of specific knowledge and understanding from the sport or exercise sciences.

This unit requires learners to plan, conduct, disseminate and review a sport or exercise science project. Learners must meet the assessment and grading criteria for this unit on an individual basis. Therefore it is recommended that learners do not investigate exactly the same topics. Institutional restrictions, however, may require learners to investigate the same discipline within the sport or exercise sciences. If this is the case, tutors must ensure that individual learners each provide sufficient evidence to meet the unit assessment and grading criteria.

For P1, learners must plan a research project. Evidence of this can be produced through written plans covering the areas as stated in the *Unit content*. Learners will be expected to outline a proposed title, be able to clearly state the aims and objectives of the project, make reference to the scope of the project, provide evidence of due regard for ethical and legal considerations, provide the research design, sample and name appropriate data collection and data analysis methods. Research project validity and reliability must also be considered. The overall purpose of the planning stage is that learners consider carefully the requirements of the project and how they will effectively complete the project.

Learners are expected to conduct the research project (P2) individually, considering the use of resources and ethical and legal issues. Learners will need to collect, and record, their own data (P3). Evidence of this could be reflected through witness statements from the tutor that clearly demonstrate learners' performance throughout the research project. As with the planning stage, evidence of ensuring the welfare and safety of the participants should be included.

After conducting the project, learners will be required to produce (P4), using ICT, a research report that covers the *Unit content* for 'scientific structure of the research report'. In order to meet P4, learners' research project should have internal coherence. Learners should relate the literature to the aims of the project, making arguments in the discussion section that are related specifically to project aims and drawing valid conclusions. The research report must provide evidence of the use of a wide variety of books, periodicals and websites.

For P5, learners must produce a review of the project that outlines whether the project aims have been met, providing evidence to support the review. Learners will need to describe the strengths of the project, areas for improvement and make future recommendations for further research.

Grading criterion M1 builds on P1, and learners must explain how the chosen research design and data collection method(s) will ensure data analysis is valid and reliable. In the conducting phase of the project (M2), learners must correctly analyse the collected data, for example, correctly using statistical formulae to calculate the correct answers or correctly coding interview transcriptions. Data must be analysed in a valid manner and a description provided of the techniques used.

When reviewing the project (M3), learners must explain whether or not the aims of the project were achieved and the evidence they have to support their conclusion. Learners will also need to explain areas for improvement and future recommendations for further research.

In the conducting stage (D1), learners will need to analyse the data effectively and provide an explanation of the data analysis techniques used. For D2, learners should review their research project and justify their proposals for further research. In their justification, learners should provide reasons or give evidence to support how they arrived at their conclusions.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

| Criteria covered | Assignment title | Scenario | Assessment method |
|------------------|------------------|--|---|
| P1, M1 | Project Proposal | You are working in a sport and exercise science laboratory and have been asked to conduct an independent research project. Prepare a formal proposal for a general area of study detailing ethics, resources, methods etc. | Written project proposal. |
| P2, P3, M2, D1 | Research Project | Learners to carry out research/ conduct experiments to test hypotheses. | Written report following experiments. Witness statement. |
| P4, P5, M3, D2 | Final Report | Learners to produce a detailed report of their project. | Full scientific report. |

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Sport and Exercise Sciences sector suite. This unit has particular links with the following unit titles in the BTEC Sport suite and the BTEC Sport and Exercise Sciences suite:

| Level 3 Sport | Level 3 Sport and Exercise Sciences |
|--|--|
| Research Investigation in Sport and Exercise Sciences | Research Methods for Sport and Exercise Sciences |
| Laboratory and Experimental Methods in Sport and Exercise Sciences | Research Investigation in Sport and Exercise Sciences |
| | Laboratory and Experimental Methods in Sport and Exercise Sciences |

Essential resources

Learners will need access to word processing, databases and spreadsheet software, as well as scientific calculators to practice statistical methods by hand. In addition, learners' choice of project may require further specialist resources.

Employer engagement and vocational contexts

This unit focuses on conducting a research project and is of particular benefit to those learners who want to progress to further study, where work of this nature is integral to most undergraduate degree programmes.

It would be useful for centres, where possible, to link delivery of this unit with colleagues in Higher Education Institutions, for example partner institutions or university research teams. Where possible, learners studying this unit could become subjects for undergraduate research, and in doing so, would develop knowledge through experience, as viewed from the perspective of a subject.

Indicative reading for learners

Textbooks

Gratton C and Jones I – *Research Methods for Sport Studies* (Routledge, 2003) ISBN 9780415268783

Silverman D – *Doing Qualitative Research* (Sage Publications, 2004) ISBN 9781412901963

Silverman D – *Interpreting Qualitative Data* (Sage Publications, 2006) ISBN 9781412922456

Vincent W J – *Statistics in Kinesiology* (Human Kinetics Europe, 2004) ISBN 9780736057929

Journals

Journal of Sports Science and Coaching

Journal of Sports Sciences

Peak Performance

Sports Injury

Websites

American College of Sports Medicine

www.acsm.org

British Association of Sport and Exercise Sciences

www.bases.org.uk

Human Kinetics

www.humankinetics.com

Sport Science

www.sportsci.org

Top End Sports

www.topendsports.com

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

| Skill | When learners are ... |
|------------------------------|--|
| Independent enquirers | planning a sport science or exercise science-based research project carrying out sport science or exercise science-based research producing a full research report using a standard scientific structure |
| Creative thinkers | planning a sport science or exercise science-based research project |
| Reflective learners | carrying out a review of the research project conducted, describing strengths, areas for improvement and future recommendations |
| Self-managers | planning a sport science or exercise science-based research project carrying out sport science or exercise science-based research. |

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

| Skill | When learners are ... |
|------------------------------|---|
| Independent enquirers | planning resources, and reaching conclusions |
| Creative thinkers | determining the focus of their project |
| Reflective learners | evaluating the quality of their report and of the subject area |
| Self-managers | demonstrating personal responsibility and coping with challenges when conducting the project. |

● Functional Skills – Level 2

| Skill | When learners are ... |
|--|--|
| ICT – Use ICT systems | |
| Select, interact with and use ICT systems independently for a complex task to meet a variety of needs | producing the results for their final report, selecting appropriate methods of display |
| Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used | preparing questionnaires, surveys or data collection sheets |
| Manage information storage to enable efficient retrieval | recording results |
| Follow and understand the need for safety and security practices | storing electronic data and data results |
| ICT – Find and select information | |
| Select and use a variety of sources of information independently for a complex task | researching for a literature review |
| Access, search for, select and use ICT-based information and evaluate its fitness for purpose | researching for a literature review |
| ICT – Develop, present and communicate information | |
| Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records | presenting the final report |
| Bring together information to suit content and purpose | interpreting data gathered in the project presenting the project |
| Present information in ways that are fit for purpose and audience | presenting the project |
| Evaluate the selection and use of ICT tools and facilities used to present information | presenting the project |
| Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists | using email to communicate with subjects or for advice from their tutor |

| Skill | When learners are ... |
|---|---|
| Mathematics | |
| Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations | interpreting data results of the project |
| Select and apply a range of skills to find solutions | applying a statistical test to analyse data collected |
| Draw conclusions and provide mathematical justifications | interpreting data results |
| English | |
| Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts | discussing the context, methodology and analysis of the results |
| Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions | interpreting relevant literature to support their project |
| Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively | recording the results of the project accurately presenting the final report. |