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ULBS
Universitatea "Lucian Blaga" din Sibiu

"Lucian Blaga" University of Sibiu | LBUS | Romania

University of Tromsø – The Arctic University of Norway | UiT | Norway

LEARNER-BASED METHODOLOGY

ENSURE

Educating students for developing high quality research skills

Learner-based methodology Intellectual Output 2

The "Educating students for developing high quality research skills (ENSURE)" project benefits from a 41.810 € grant from Iceland, Liechtenstein and Norway through the EEA and Norway Grants. The aim of the project "Educating students for developing high quality research skills (ENSURE)" is to strengthen the academic and research partnership between LBUS and the UiT through knowledge exchange and cooperation in the field of medicine and medicine-related studies. Also the project strives to foster quality improvement in pedagogical and didactical approaches supported by the use of a learner-centred approach with focus on development of soft-skills as well as on exchange of ideas that facilitate cooperation and joint research.

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Foreword

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The project entitled Educating students for developing high quality research skills (ENSURE) supported both partner universities "Lucian Blaga" University of Sibiu | LBUS and University of Tromsø – The Arctic University of Norway | UiT in establishing **high quality standards in academic research** by focusing on transversal research-oriented competences and on practicing the acquired knowledge in an international research team. Also ENSURE project strives to foster quality improvement in pedagogical and didactical approaches supported by using a learner-centered approach with focus on development of soft-skills as well as on exchange of ideas that facilitate cooperation and joint research.

The **main focus** of the project was to improve the **key professional skills in research** of students of both higher education institutions. The project target group consisted of students in the last years of their medicine or medicine-related studies as well as young researchers who have just started their PhD. The project also targeted teachers who aim to modernize curricula with more learner-based approaches and transversal skills, and, finally hospitals and industrial research facilities who aim to equip their staff with the corresponding transversal skills through the multiplier event where the intellectual outputs were presented.

I am confident that the **Intellectual Outputs** will prove helpful for all parties involved. I want to encourage the reader to take time to become acquainted with the **key concepts** and issues as well as to look for support and help from those who have already proved their success in research activities. I do believe that, in view of the growing availability of archived and real-time digital health data and the opportunities this data provides for research, as well as the increasing number of studies using prospectively collected clinical data, the materials contained in the ENSURE project **Intellectual Outputs** will be of great value to the future research activities of the students, researchers and teachers.

Foreword

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Institute of Community Medicine
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UiT The Arctic University of Norway

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It has been a pleasure for UiT The Arctic University of Norway to transfer teaching in Scientific Competence through the project “Educating students for developing high quality research skills (ENSURE)“ to the “Lucian Blaga” University of Sibiu (LBUS).

In 2019, the World Economic Forum made a list of the top 10 skills needed in the future. Critical thinking ranked second, after complex problem solving and before creativity. We believe that Scientific Competence is the basis for critical thinking and has to be a part of continuous medical education. That is why we have put much efforts and resources into developing a comprehensive year-by-year program for Scientific Competence at UiT The Arctic University of Norway.

Scientific competence in medicine deals with basic principles of medical research methods in general and clinical epidemiology, biostatistics, knowledge assessment, patient safety and quality improvement work.

The teaching focuses on providing students with an understanding of how medical knowledge are developed, can be challenged and improved with the use of epidemiological methods and statistical analysis.

UiT teaches Scientific Competence each year for medical students. During the 1st year, the teaching comprises common core sessions and group work with students of other health professions. The fall semester of the second year is the theoretical basis for education in Scientific Competence. Over the other semesters, the students encounter the concepts organized thematically or integrated in clinical lectures. UiT emphasis spiral learning by increasing learning demands from theoretical understanding of concepts to independent application of the concepts in writing or in presentations of group work and reports.

Thus, one week with scientific seminars in Sibiu, although successful, could just be an introduction to the field.

We hope that this document will prove an insight for all who want to know more about educating students for developing high quality research skills and become motivated for building valid scientific competence for future achievements in medicine.

Topics

TOPICS /TRAINING	TRAINER	UNIVERSITY
Scientific teaching at medical school	Prof. Finn Egil Skjeldestad	UiT
How to conduct/design of clinical studies	Prof. Finn Egil Skjeldestad	UiT
How to deal with uncertainties in clinical practice?	Prof. Frode Forland	UiT
PICOs (Population, Interventions, Comparisons, Outcomes, Study Design)	Prof. Frode Forland	UiT
Legal provision in medical and human-related scientific research	Patricia Mihalache, PhD	LBUS
Ethics in research	Prof. Victor Costache Radu Stroia PhD	LBUS
Search strategies in information systems	Prof. Eirik Reierth	UiT
How to read and assess scientific papers (GRADE)	Prof. Finn Egil Skjeldestad	UiT
Bias in epidemiological research	Prof. Finn Egil Skjeldestad	UiT
Academic writing of project plans, scientific reports	Ioana Mircea PhD	LBUS
Data collection, data cleansing, data visualization and evaluation	Gabriela Candea PhD	LBUS
How to present a project plan/scientific report	Prof. Kak Khee Yeung	LBUS

ENSURE

How a Research Paper should be written

Title

Title needs to describe the main experimental findings of the manuscript, i.e. what you found and NOT what you did.

Author

Template: Given-Name Middle-initial Family-Name, Department, Institution, City, Country, email address.

Keywords

Keywords should be words that a colleague would use to find your paper, it should be specific and not general. The keywords are ordered alphabetically, and usually are 5 keywords requested.

Abbreviations

A list with all abbreviations used in the text is mandatory. Usually is at the beginning of the document after the Content. Common abbreviations such as DNA are NOT necessary in this list.

The common text style for abbreviation is:

Abb1, abbreviation 1; Abb2, abbreviation 2

Abstract

The abstract must provide a succinct SUMMARY of the whole paper and should include the following elements

- 1-2 sentence background, stating what is known and what remains to be discovered
- Aim/goal of your study
- Brief description of the methods/techniques used
- Results – major results of your paper must be included
- Novelty, conclusions and potential implications of your study

The research paper

Any paper must contain the chapters:

Introduction, Materials and Methods, Results, Discussions, Acknowledgement, Conflict of interest and References.

Introduction

The introduction must provide a brief survey of the existing literature in the subject. Inside this section is described the problem under investigation and state the aim of the study.

Materials and methods

Within this section, the materials and methods used in the study are described. Previously reported methods should be cited rather than copied directly. For special materials and equipment, the manufacturer's name and location should be provided. There should be sufficient detail in this section to ensure that an educated reader is able to replicate your results.

Subheadings should be used and these headings should be informative and provide relevant keywords to help with search engine optimization.

Results

Describe the results of your study. Provide statistical information that confirm your study. Data appearing in the same section should be included in the same figure.

Discussion

This section must contain the main findings and explain their meaning and importance. The findings need to be discussed in context of the available literature. It's usual to acknowledge the limitations of the study, and make suggestions for further research. Also, the conclusions drowned from the study must be presented in a paragraph.

Acknowledgement

Include any acknowledgements of general support, technical help or financial and material support. Provide full grant numbers, if applicable.

Conflict of interest

Any potential sources of conflict of interest must be disclosed. A potential conflict of interest may be if the author was/is a consultant for a company involved in the study. This declaration will not influence the decision to publish the paper; a failure to declare however, may lead to rejection or retraction of the paper. If there are none, the usual text is: "The authors declare no financial or commercial conflict of interest."

References

Depended on the domain, and the place where the research paper is published the references should be conform with different styling. In the medical domain, the references are listed in the order in which they appear in the text, and then in the tables and figure legends. In-text citations (numbers in square brackets) are placed in the text before punctuation.

Style the references:

- for articles with 5 authors or less, all authors will be listed.
- for articles with more than 5 authors, 4 authors will be listed followed by et al.
- for articles that do not yet have a page number, DOI link must be included

References are:

- articles that are part of the scientific published record.

DO NOT include

- **websites** - URLs are included in the main text only
- **unpublished works**. Any submitted papers should be listed as "unpublished data" in brackets in the main text.

Examples of reference style:

[1] Yum, K., Hong, S. G., Healy, K. E., Lee, L. P., A Computational Analysis. Biotechnol. J. 2014, 9, 16–27.

[2] Senís, E., Jake, C., Costache, S., Popescu, E. et al., Streamliner Multilayer Flow Modulator for subacute complicated type B dissection using the phantom technique. Biotechnol. J. 2015, 10, DOI:10.1115/1.4043076.

[3] Bisaria, V. S., Kondo, A. (Eds.), Aortic Remodeling After Total Endovascular Aortic Repair With Multilayer Stents: Computational Fluid Dynamics Analysis of Aortic Remodeling Over 3 Years of Follow-up, Wiley-VCH, Weinheim 2019.

[4] Geis, A., How does the multilayer flow modulator work? The science behind the technical innovation, in: Heller, K. J. (Ed.), Genetically Engineered Food – Methods and Detection, Wiley-VCH Verlag, Weinheim 2003, pp. 100–118.

[5] Pandey, R., Ratnani, K., Ahmed, S., Williams, J., Direct conversion of methane to hythane. US Patent 5516967, 1996.

Tables

The tables are numbered with Arabic numerals, including a short title. At the top, the column headings should indicate units, and any other additional information should be included in the footnotes.

Figures

The figures shouldn't be embedded in the text file and are numbered with Arabic numerals. Any figure should contain a caption self-explanatory and allow readers to understand the data without referring to the main text. For a print format the figure should have a resolution of 300 dpi at the final printed size.

Sans-serif fonts such as Arial and Helvetica are preferred. Font size should be consistent across comparable labels and figures.

Avoid excess elements, lines and colors. Remove unnecessary background grids. Prepare the figure at final print size and ensure that the figures are clearly legible at this size.

ENSURE

Thank you!

ENSURE

EDUCATING STUDENTS FOR DEVELOPING
HIGH QUALITY RESEARCH SKILLS

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ENSURE - Educating students for developing high quality research skills

Annex – List of Workshops

- Scientific competence
- The conduct of clinical trials/framework
- Scientific competence - Case-control design
- Cohort design
- Academic writing of project plans and scientific reports
- Bias within Clinical study/ trial
- Data collection, data cleansing, data visualization and evaluation
- How to make a presentation about a scientific report
- Legal provision in medical and human-related scientific research
- Literature searching in general
- PICOs different designs (templates)
- Literature search - specific within medical domain (PubMed)