Pedagogical Research Methodology in Would-be Biology Teachers' Theses

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Methodology competence

As teachers and student trainers, we felt the need to reflect on our students' ability to master the teaching research methodology.

If pedagogy is to dispose of its cargo-cult science label and work on the basis of an evidence-based approach, future teachers must be well educated in the methodology of pedagogical research.

Aim

To explore the would-be biology teachers (MS degree) understanding and mastery of the pedagogical research methodology as a reflection of our teaching concepts.

The main examined elements:

- *type of research*
- *research tool and its using*
- *respondents selection*
- *statistical data processing*

Methods

All thesis (n=199) from two departments, 2014-2016.

Discarder thesis containing biological research or review only (n=119) → **80 pieces of pedagogical research** whose methodological characteristics were followed.

Representation of selected categories between the departments compared using Fisher's exact test.

Differences considered significant if the test level reached (p) was less than the selected 5% significance level.

Usage of research tools

Σ = 80	Absolute frequency	Relative frequency	Absolute frequency FoE	Absolute frequency FoS
Questionnaire	49	61.25 %	36	13
Interview	9	11.25 %	7	2
Didactic test	8	10.00 %	5	3
Textbook analysis	7	8.75 %	7	0
Observation	6	7.50 %	5	1
Other	1	1.25 %	1	0

FoE = Faculty of Education, FoS = Faculty of Science; remarkable, statistical significant difference

Originality of research tools

Σ = 67	Absolute frequency	Relative frequency	Absolute frequency FoE	Absolute frequency FoS
New	60	89.55 %	45	15
Modified/taken as is	7	10.45 %	3	4

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Pilot validation of used tools

Σ = 57	Absolute frequency	Relative frequency	Absolute frequency FoE	Absolute frequency FoS
Pilot study	22	38.60 %	8	14
No pilot study	35	61.40 %	33	2

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Ways of communication with the respondents

Σ = 72	Absolute frequency	Relative frequency	Absolute frequency FoE	Absolute frequency FoS
Personally	50	69.44 %	35	15
Electronic form	10	13.89 %	7	3
Combination personally + electronically	7	9.72 %	6	1
Email	4	5.56 %	4	0
Not specified	1	1.39 %	1	0

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Methods of respondents selection

Σ = 75	Absolute frequency	Relative frequency	Absolute frequency FoE	Absolute frequency FoS
Not specified	31	41.33 %	26	5
Home school, school working, etc.	13	17.33 %	8	5
Mikroregion	12	16.00 %	10	2
Targeted selection	7	9.33 %	7	0
Whole file	6	8.00 %	3	3
Classmates (ie other graduates)	4	5.33 %	0	4
Snowball	2	2.67 %	2	0

Statistical data processing of quantitative data

Σ = 61	Absolute frequency	Relative frequency	Absolute frequency FoE	Absolute frequency FoS
Only absolute and relative frequencies	38	62.30 %	36	2
Inductive statistics	21	34.43 %	7	14
Only descriptive statistics	2	3.28 %	2	0

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Discussion

The level of knowledge and skills acquired in the field of pedagogical research is unsatisfactory in the studied sample.

In more than 40 % of researches, there is no information about selecting respondents.

In 62 % of the analyzed studies, the graduates' data analyse outputs were limited to frequencies.

There is a significant difference between departments where the students graduated.

Conclusion

The results or our study revealed some education gaps, these include in particular:

- insufficient ability of description and justification of the choice of research methods and tools used,
- lack of psychometric properties verification in used research tools,
- insufficient description of the respondents' selection and justification of the choice of data processing methods.

Introducing a methodological courses focusing on pedagogical research (and motivating students to choose it if already on offer) and a more consistent approach of trainers and opponents of theses can be a partial solution.

Thank you for your attention

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