Evaluation of the self efficacy of learners during intensive statistical training sessions

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Context

• Increasing availability of spatial data
• Growing set of applications
• Need for skills and tools to: access, extract, explore and analyse such data

Building an European master level course: OPEN SPAT

Three partners:
• Liege University
• Montpellier SupAgro
• University of Lisboa

Funded by:
• Erasmus + Key Action 2 Strategic Partnerships for adult education
OPENSPAT : lifelong learning course

Module 1 : (Lisbon)
- Access and manipulate spatial data
- Spatial autocorrelation – variogram – variance estimation
- Introduction to linear model

Module 2 : (Montpellier)
- Variogramme – Kriging
- Regression over spatially autocorrelated variables

Module 3 : (Gembloux)
- Pattern recognition with spatial constraints: clustering & classification
Standard training day

• AM: Background theory

• PM: Real-size case studies in peer learning
OPENSPAT: lifelong learning course

Designed to upgrade people already trained in statistics

⇒ Check the consistency and adequacy of the learning module

⇒ 13 PhD students tested the first session
  − From different countries (France, Portugal, Belgium)
  − With different background (Geomatics, agronomy, forestry, …)

Motivation plays a fundamental role in learning

⇒ Evaluation of the learners’ motivation
What is the test learners’ profile?

You are interested in **using** Statistical analysis of spatial data
- 83%
- 9%
- 8%

You are interested in **understanding** Statistical analysis of spatial data
- 87%
- 13%

Public much more demanding than future learners

You will have **application** of statistical analysis of spatial data in **your current profession**

- 46%
- 27%
- 13%
- 7%
- 7%
Methodology

- 3 learning modules in 3 different countries (AM: theory / PM Practical)
- One questionnaire after each learning session (7-point Likert scale)

- Self efficacy (5 items; $\alpha = 0.85$)
- Task value (5 items; $\alpha = 0.74$)
- Interest (4 items; $\alpha = 0.74$)
- Competence (13 items; $\alpha = 0.89$)
- Professor’s attitude (2 items; $\alpha = 0.61$)
- Peer learning (7 items; $\alpha = 0.76$)
- Modules evaluation (2 items; $\alpha = 0.78$)

* 37 items inspired by the Intrinsic Motivation Inventory and the SATS-36
Self efficacy (5 items)

Mean (M) and Standard Deviation [SD]

<table>
<thead>
<tr>
<th>Module</th>
<th>M [SD]</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4,96 [1,22]</td>
<td>5,08 [1,20]</td>
<td>5,40 [0,97]</td>
</tr>
</tbody>
</table>

I'm confident in my abilities to interpret spatial data

Before: 14
Module 1: 11
Module 2: 11
Module 3: 13

I'm confident in my abilities to choose the right method for analyzing spatial data

Before: 11
Module 1: 11
Module 2: 7
Module 3: 11
### Self efficacy (5 items)

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<td>4.96 [1,22]</td>
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At the end of the learning module I feel much more efficient in this field.

![Bar chart showing positive, neutral, and negative responses for each module](image)
## Competence (13 items)

### Mean (M) and Standard Deviation [SD]

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<tr>
<td>Module 1</td>
<td>4.52 [1.65]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 2</td>
<td>4.93 [1.61]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 3</td>
<td>4.74 [1.74]</td>
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**You succeeded to understand** the essential of **content** during the **theoretical course**

- Module 1: 6 Positive, 6 Neutral, 2 Negative
- Module 2: 12 Positive, 1 Neutral, 1 Negative
- Module 3: 13 Positive

**You succeeded to complete** the majority of **exercises** proposed during the **practical course**

- Module 1: 4 Positive, 1 Negative
- Module 2: 11 Positive, 1 Neutral, 1 Negative
- Module 3: 6 Positive, 3 Neutral, 4 Negative
Module evaluation (2 items)

Mean (M) and Standard Deviation [SD]

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<td>Module 1</td>
<td>5,36 [1,22]</td>
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<tr>
<td>Module 2</td>
<td>5,27 [0,87]</td>
</tr>
<tr>
<td>Module 3</td>
<td>5,50 [1,21]</td>
</tr>
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</table>

The **organization** for this learning module **was perfect**

- Module 1: 13 Positive, 1 Neutral, 1 Negative
- Module 2: 10 Positive, 3 Neutral, 3 Negative
- Module 3: 11 Positive, 1 Neutral, 2 Negative

Your **expectations** for this module **have been met**

- Module 1: 11 Positive, 2 Neutral, 2 Negative
- Module 2: 12 Positive, 2 Neutral, 1 Negative
- Module 3: 11 Positive, 2 Neutral, 2 Negative
Professor’s attitude & Peer support

Mean (M) and Standard Deviation [SD]

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<th>Module 2</th>
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<tr>
<td>Professor’s attitude</td>
<td>6,07 [0,98]</td>
<td>5,62 [1,02]</td>
<td>6,00 [0,84]</td>
</tr>
<tr>
<td>(2 items)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Peer support</td>
<td>5,39 [1,46]</td>
<td>4,85 [1,54]</td>
<td>5,17 [1,66]</td>
</tr>
<tr>
<td>(6 items)</td>
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</table>

The teacher's contribution to this learning module was positive and effective.

You have benefited from interacting with your peers (colleagues).
Spearman Correlation Coefficients

Consistent with data in the scientific literature
Conclusions

• Feedback from test students is very positive

• The different parameters that can influence motivation seem to be activated

• Validation of the standard training day theory/practice and the sequencing of the different modules

• Evolution of the feeling of self-efficacy through the learning session: Validation of the proposed pedagogical activities

=> Test the learning session in version « lifelong learning course »
Acknowledgements

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