



EVALUATION OF THE RESULTS OF THE SAILS IBSE AND ASSESSMENT TEACHER EDUCATION PROGRAMME

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STRUCTURE OF TALK

- Background
- Teacher education programme
- Analysis
- Results

CHALLENGES TEACHERS FACE IMPLEMENTING INQUIRY

- Teachers may not understand inquiry and how to implement it effectively in the classroom^{1,2,3}
- Teachers often believe that inquiry takes up too much time and as a result may struggle to cover the curriculum^{4,5}

1. Crawford, B.A. (2000). Embracing the essence of inquiry: new roles for science teachers. *Journal of Research in Science Teaching*

2. Roehrig, G. H. & Luft, J. A., 2004. Constraints experienced by beginning secondary science teachers in implementing scientific inquiry lessons. *International Journal of Science Education*, 26(1), pp. 3 - 24.

3. Hong, J. & Vargas, P. Science teachers' perception and implementation of inquiry-based reform initiatives in relation to their beliefs and professional identity. *International Journal of Research Studies in Education* 4.5 (2015).

4. Lehman, J. D., George, M., Buchanan, P. & Rush, M., 2006. Preparing Teachers to Use Problem-centred, Inquiry-based Science: Lessons from a Four-Year Professional Development Project. *Interdisciplinary Journal of Problem-Based Learning*, 1(1), pp. 76-99.

5. Anderson, R.D. (2007) Inquiry as an organising theme for science curricula. In: Abell & Lederman (Eds.), *Handbook of research on science education* (pp. 807 – 830) Mahwah, NJ: Lawrence Erlbaum Associates

ASSESSMENT BACKGROUND

- Assessment has been identified as a technical barrier to implementing inquiry instruction.⁶
- Various obstacles also prevent teachers changing their assessment practices, e.g. time⁷, assessment of group work⁸ and attachment to traditional grading⁹
- To prepare teachers to teach through inquiry they need to acquire new assessment skills.

6: Anderson, R. D., 2002. Reforming Science Teaching: What Research Says About Inquiry. *Journal of Science Teacher Education*, 13(1), pp. 1 - 12.

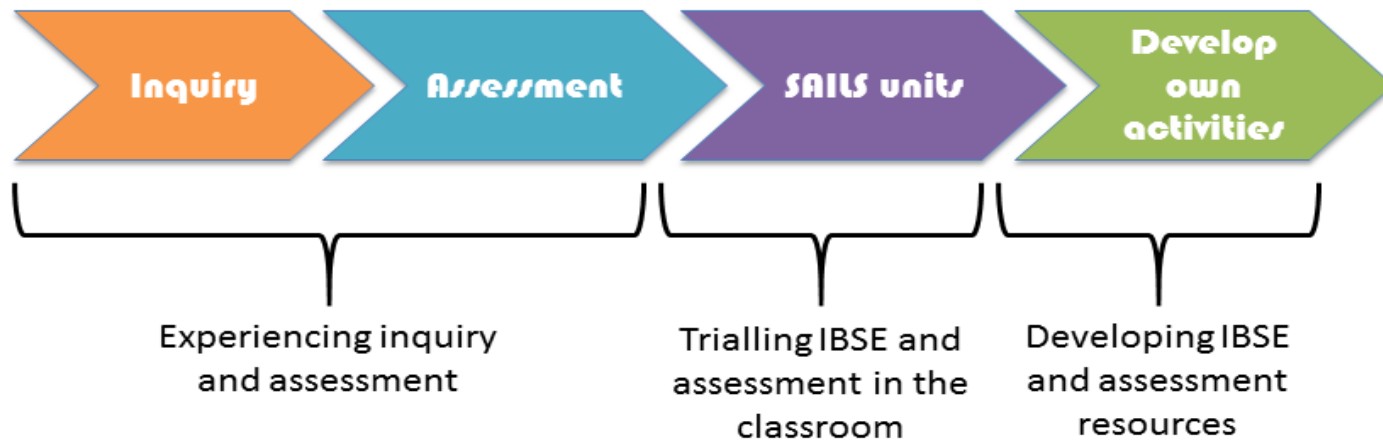
7: Wolfe, E. W. & Miller, T. R., 1997. Barriers to the Implementation of Portfolio Assessment in Secondary Education. *Applied Measurement in Education*, 10(3), pp. 235-251.

8. Cizek, G. J., Fitzgerald, S. M. & Rachor, R. E., 1996. Teachers' Assessment Practices: Preparation, Isolation and the Kitchen Sink. *Educational Assessment*, 3(2), pp. 159-179.

9. Guskey, T. R., 2011. Five Obstacles to Grading Reform. *Effective Grading Practices*, 69(3), pp. 16-21

SAILS

- Teacher education programmes were developed and run through the SAILS project in 12 participating countries.¹⁰
- The focus of these programmes was on inquiry assessment practices.



10. sails-project.eu/

11. Campbell, T., Abd-Hamid, N., & Chapman, H. (2010). Development of instruments to assess teacher and student perceptions of inquiry experiences in science classrooms. *Journal of Science Teacher Education*, 21, 13-30.

METHODOLOGY

- Firstly, it is important to determine the inquiry and assessment practices of teachers across Europe
- Secondly, the changes made by teachers following the programme can demonstrate the effectiveness of the SAILS TEPs.
- An investigation tool was designed, trialled and resigned to determine initial responses and changes in their inquiry assessment practices following the teacher education programmes.

ANALYSIS

Self rating:

- No experience with inquiry –N
- Beginner with inquiry - B
- Some experience with inquiry - S
- Very experienced with inquiry - V

Results presented are based
n=438 initially and n=305
matched sample

- Responses to items were subjected to Multidimensional Scaling analysis (MDS)
- MDS shows the similarity/ dissimilarity between data
- Countries' average responses mapped in relation to a most positive response (“ideal”).

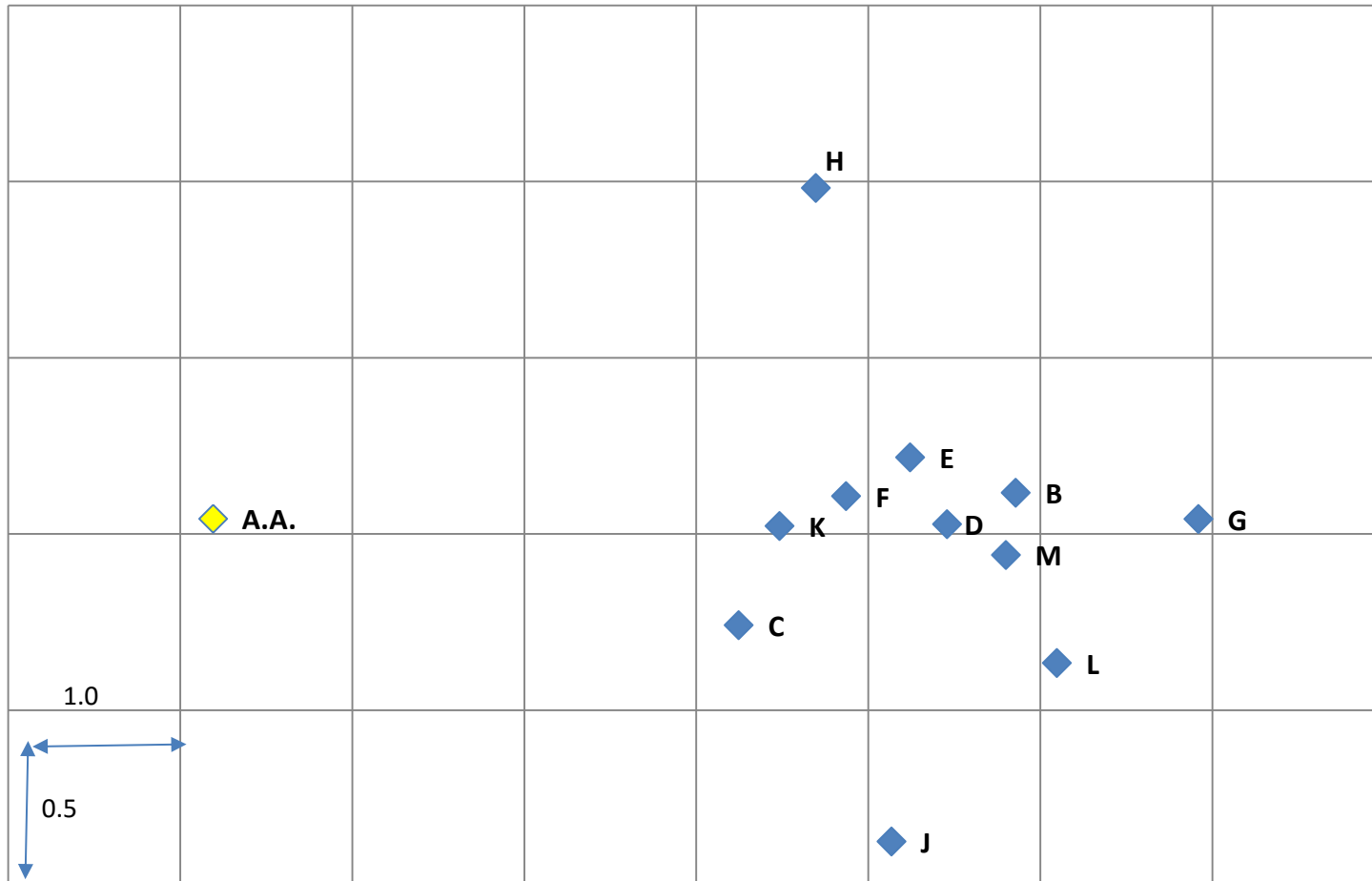


FEEDBACK

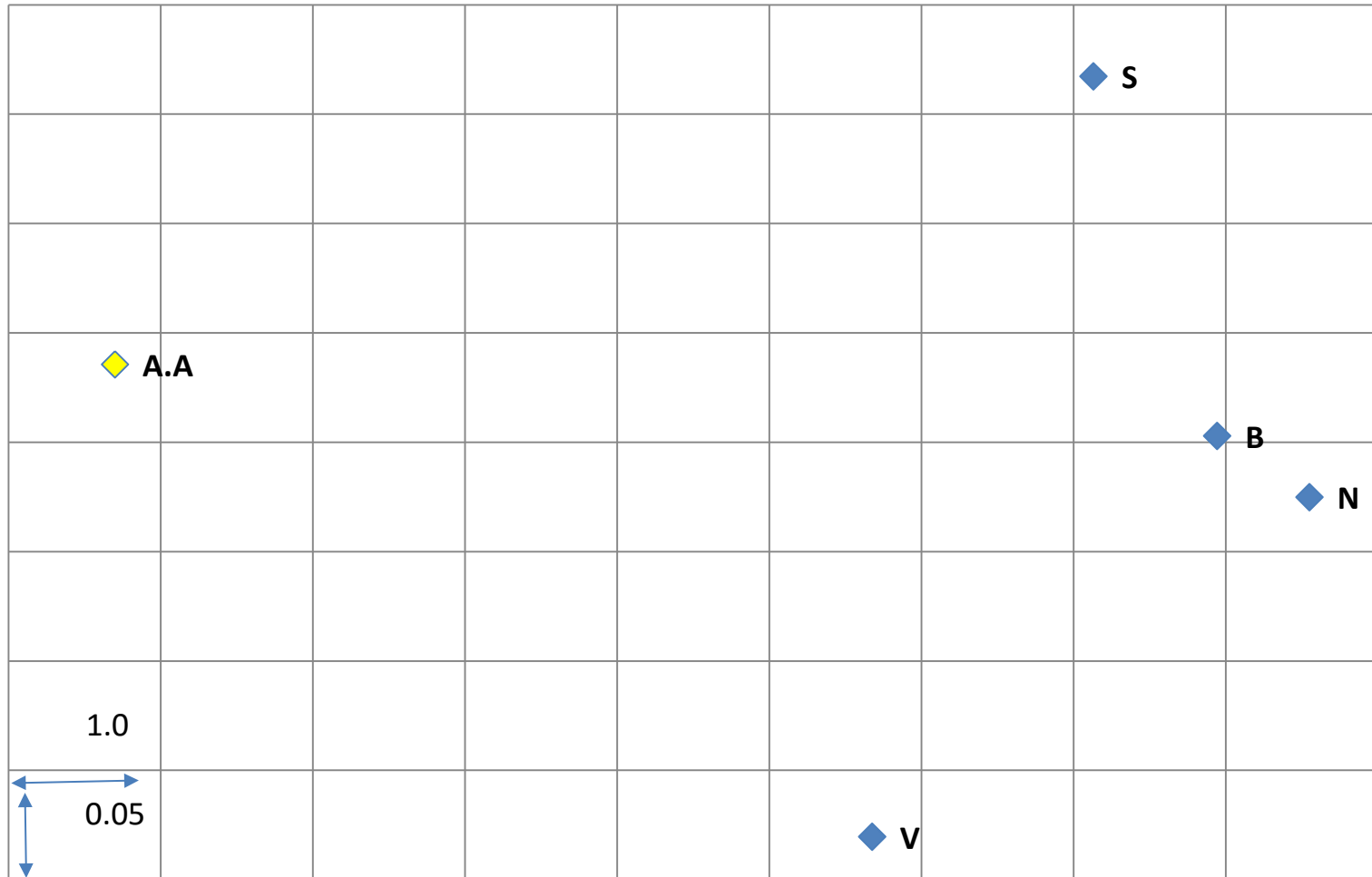
Forms of feedback	Almost never	Seldom	Sometimes	Often	Almost always
Writing comments, highlighting correct work and areas for further learning	11.4%	14.8%	29.2%	30.7%	13.9%
Discussing examples of student work with the class	9.5%	14.1%	30.7%	29.9%	15.8%
Discussing quality of inquiry with students	12.2%	19.3%	29.5%	28.0%	11.0%
Negotiating next steps in learning	15.8%	16.8%	31.4%	25.8%	10.2%

Attitudes Towards Feedback	Almost never	Seldom	Sometimes	Often	Almost always
I suggest improvements to my students during inquiry activities	5.1%	8.3%	30.8%	45.2%	10.5%
I give students opportunities to respond to my feedback	3.3%	6.6%	21.9%	46.8%	21.4%
Students use comments I give them to revise their inquiry activity	4.9%	14.3%	39.6%	34.4%	6.9%
I organise time in class for students to peer assess	8.6%	20.8%	40.0%	23.5%	7.1%
Students use feedback I give them to improve their inquiry skills	6.7%	13.6%	42.9%	31.3%	5.5%
I assess the teamwork skills of individuals during group work	12.5%	17.2%	29.2%	28.7%	12.5%

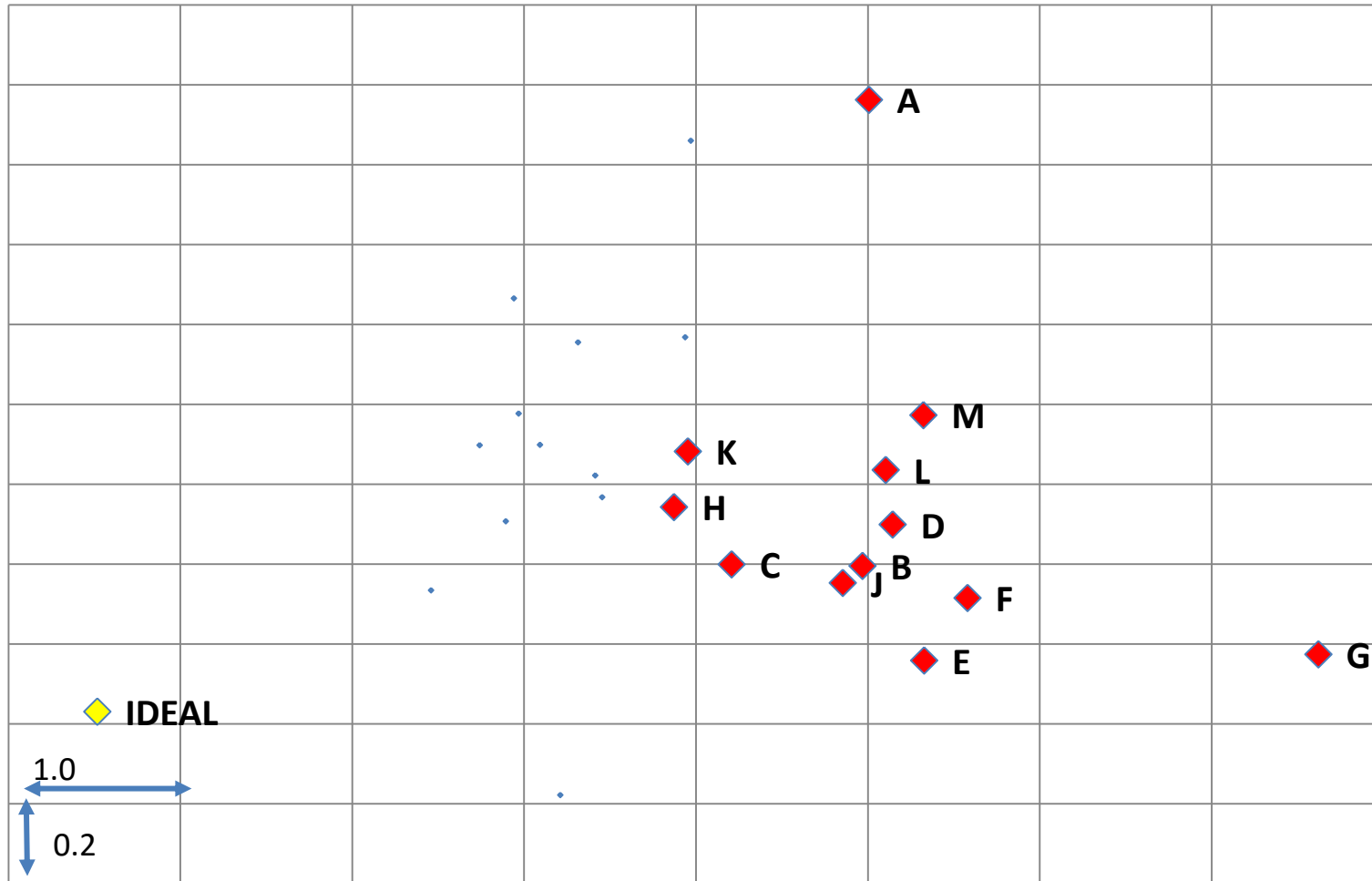
FEEDBACK



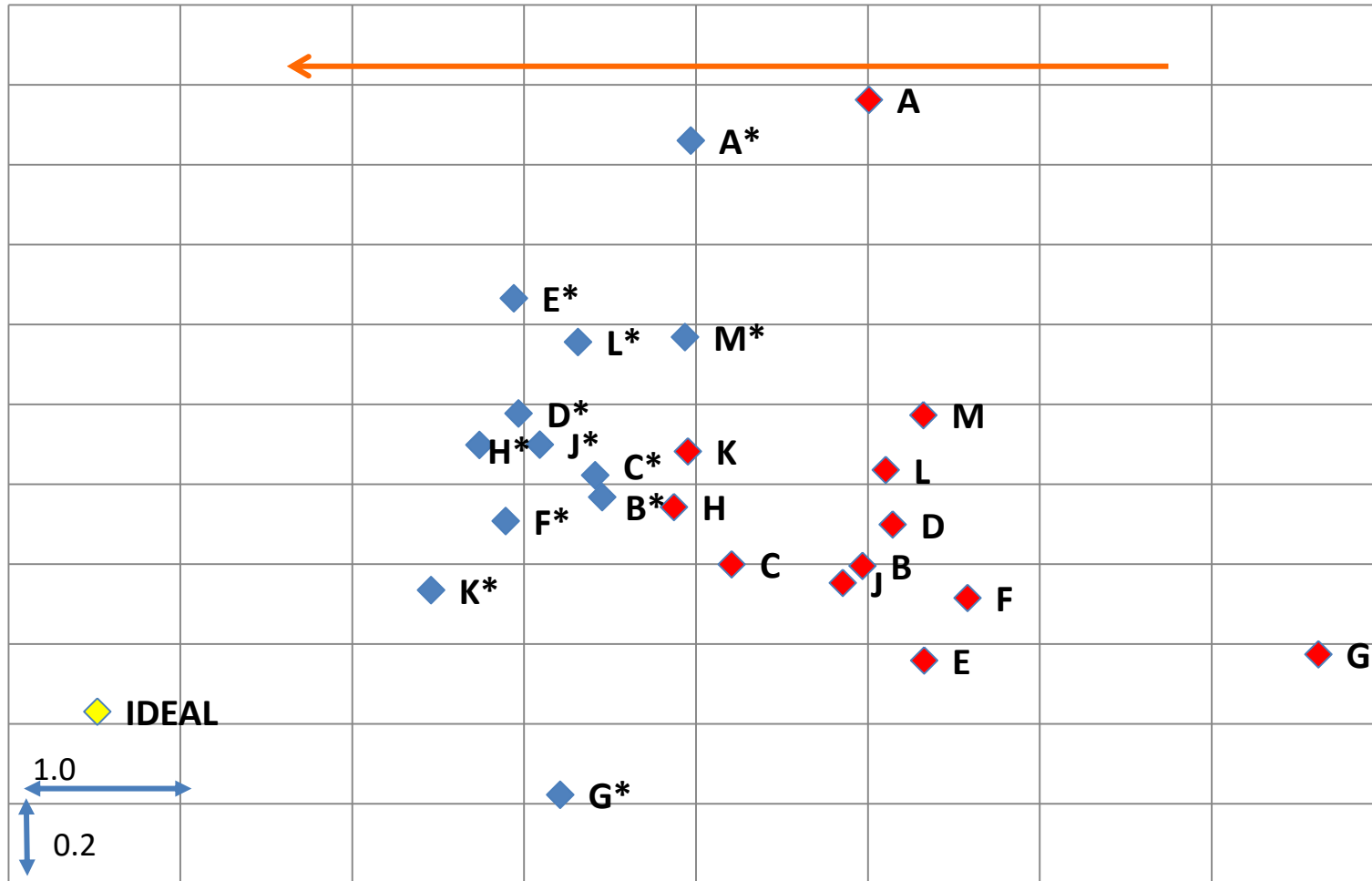
FEEDBACK – EXPERIENCE LEVEL



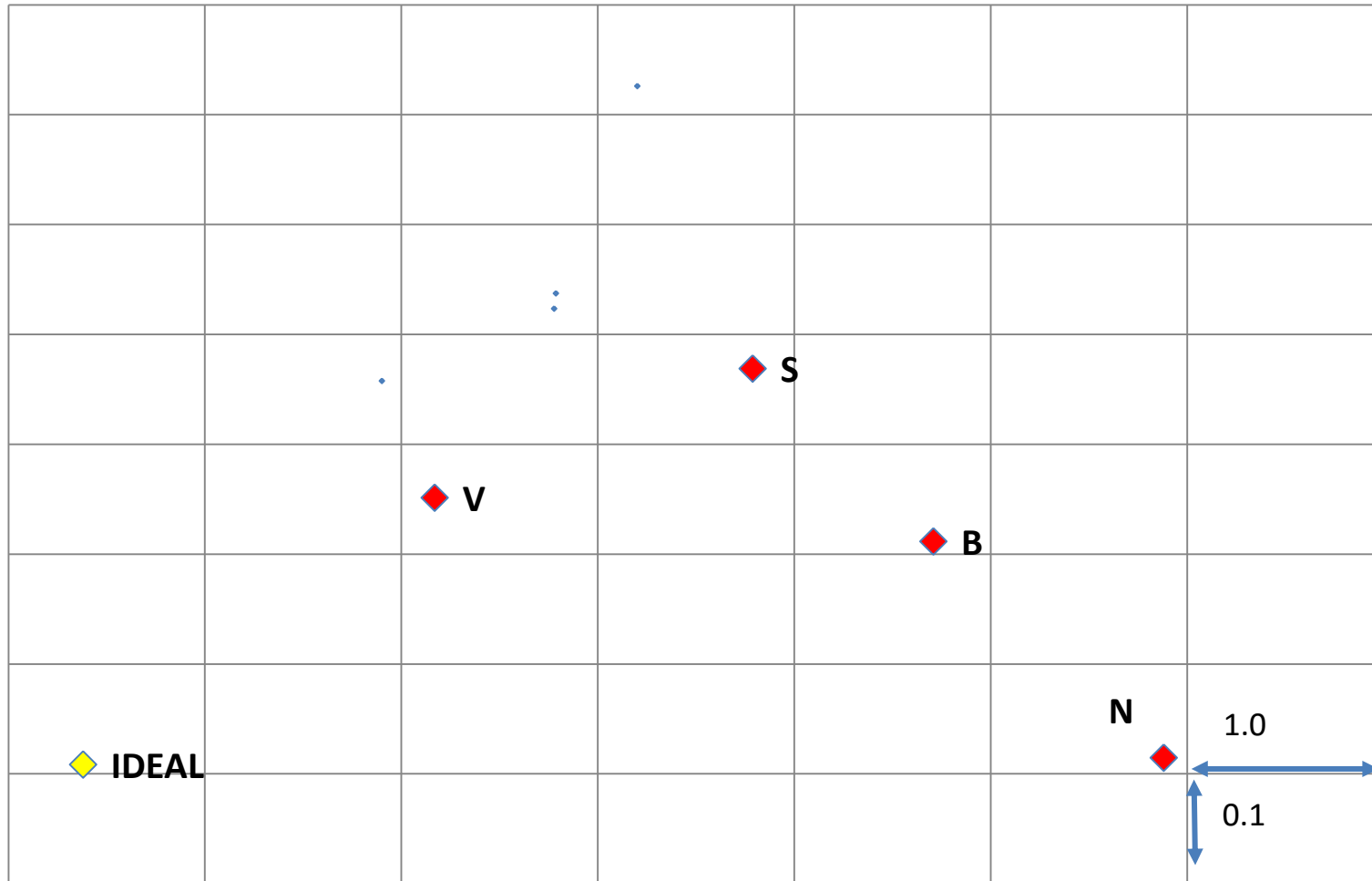
CHANGE IN UNDERSTANDING OF INQUIRY AND INQUIRY ASSESSMENT



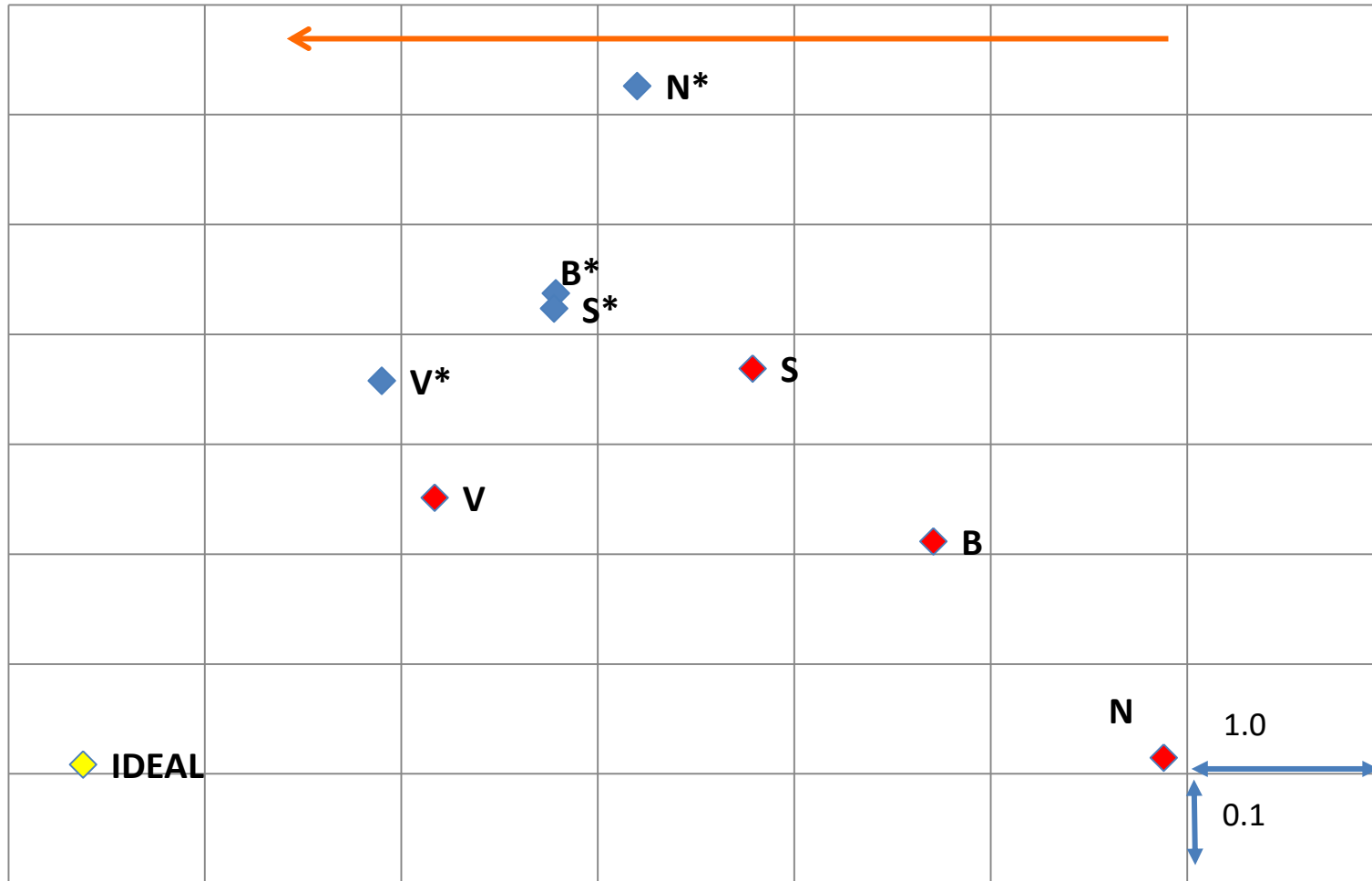
CHANGE IN UNDERSTANDING OF INQUIRY AND INQUIRY ASSESSMENT



CHANGE IN UNDERSTANDING OF INQUIRY AND INQUIRY ASSESSMENT – EXP.



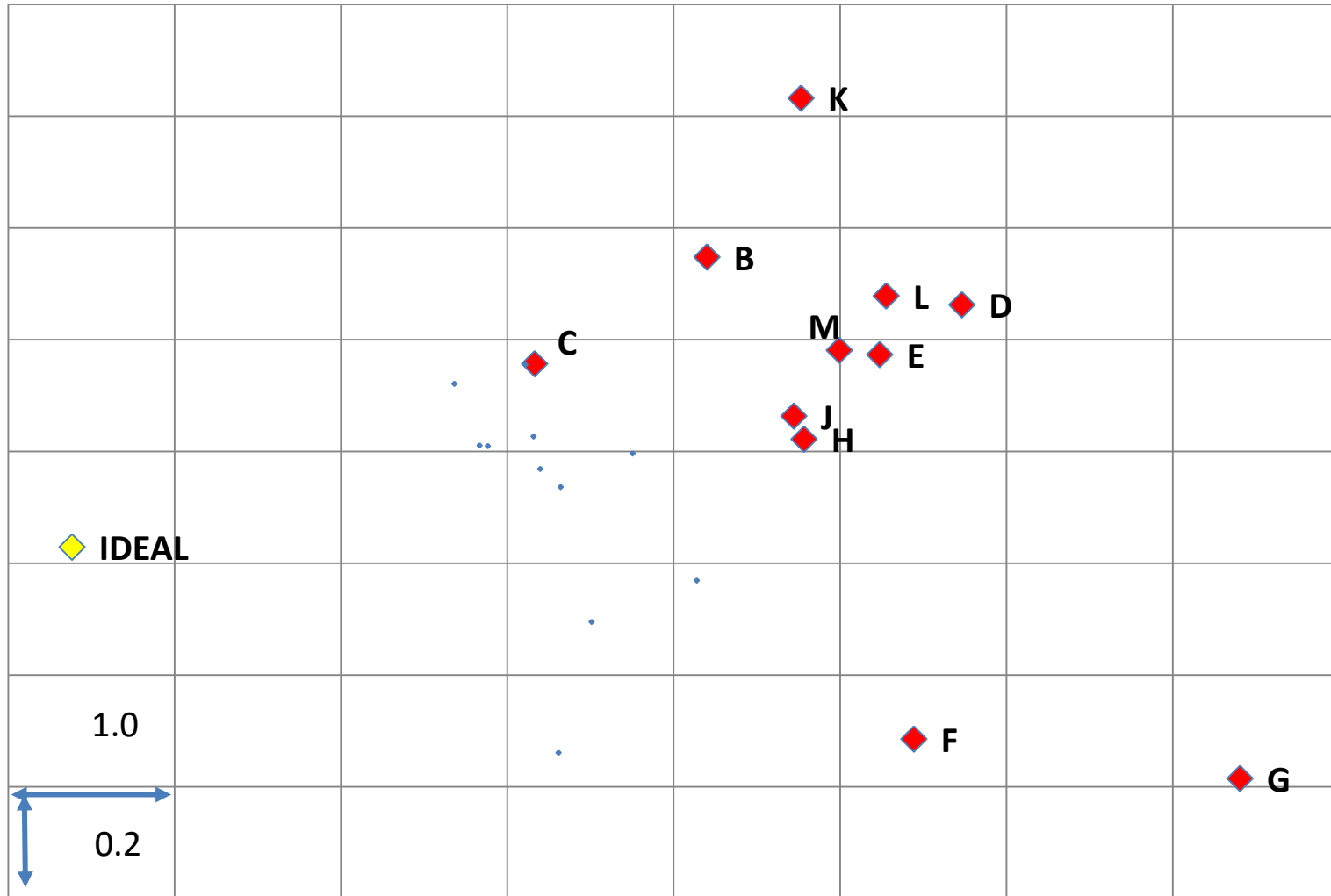
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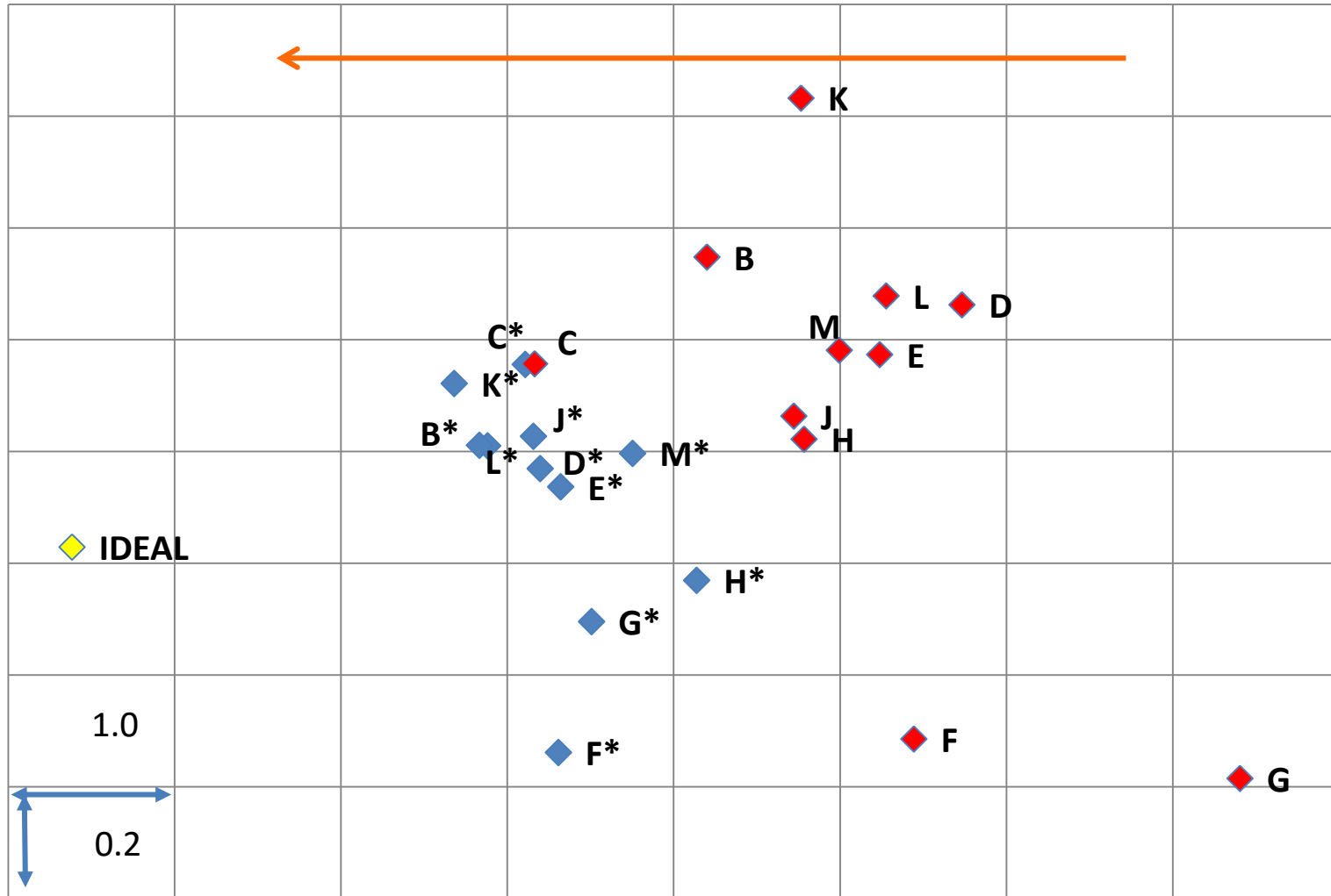
INQUIRY PRACTICES AND ASSESSMENT

- Correlations were found between the practices, assessment, and confidence assessing of **all** of the inquiry practices.
- Moderate to strong correlations between majority of items.

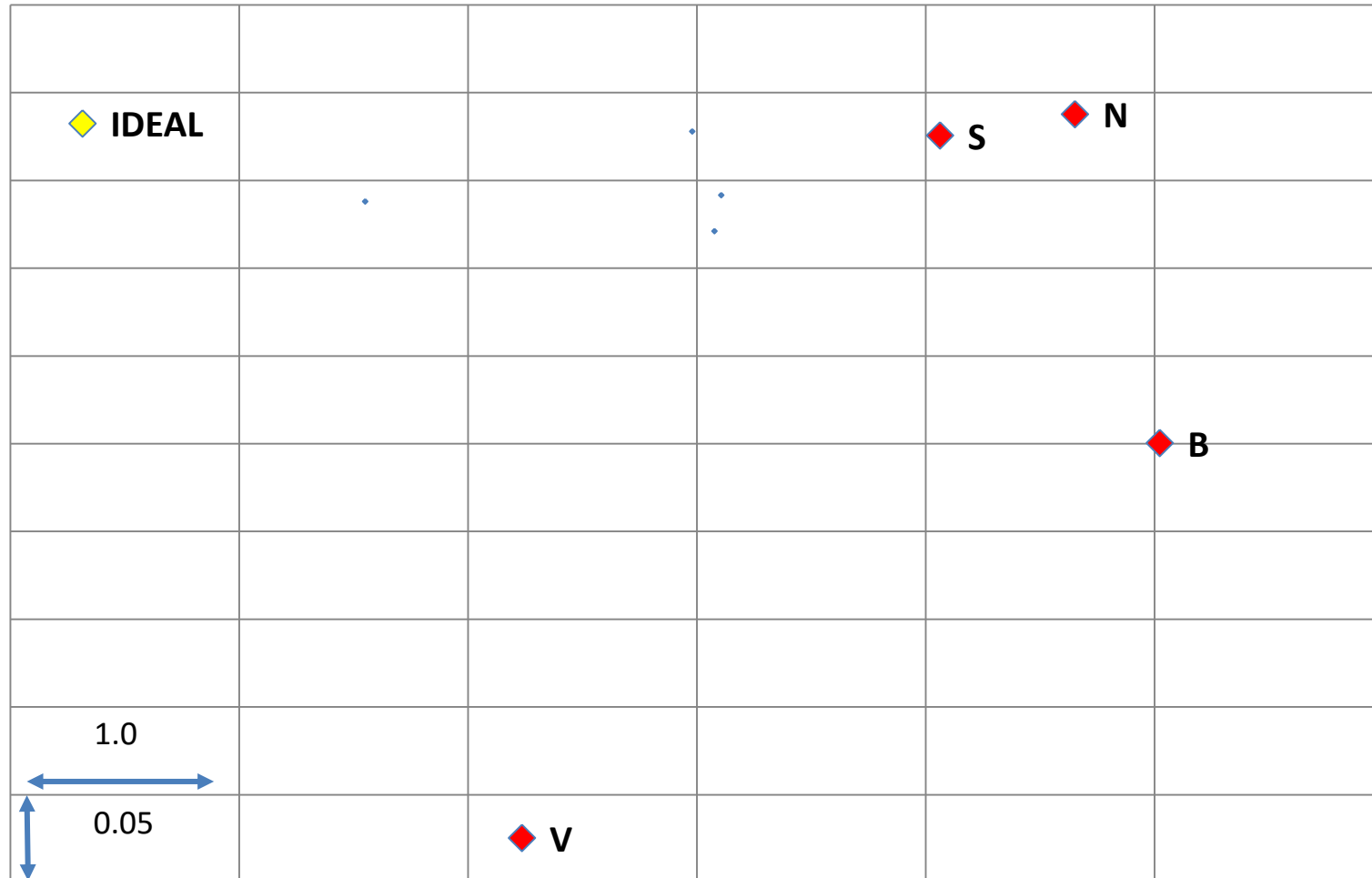
CHANGE IN CONFIDENCE ASSESSING



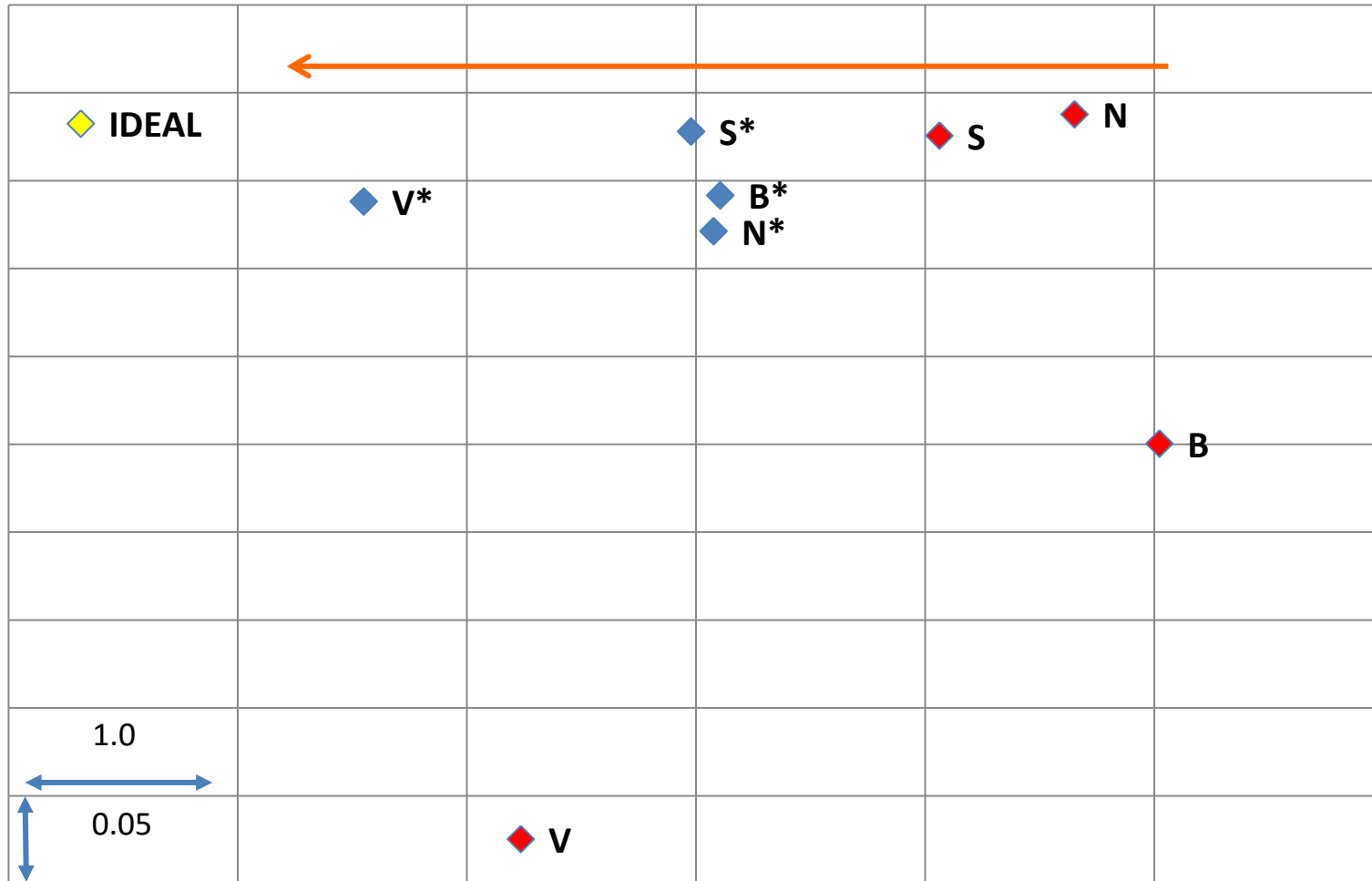
CHANGE IN CONFIDENCE ASSESSING



CHANGE IN CONFIDENCE ASSESSING – EXP.



CHANGE IN CONFIDENCE ASSESSING – EXP.



CHALLENGES BY EXP. LEVEL

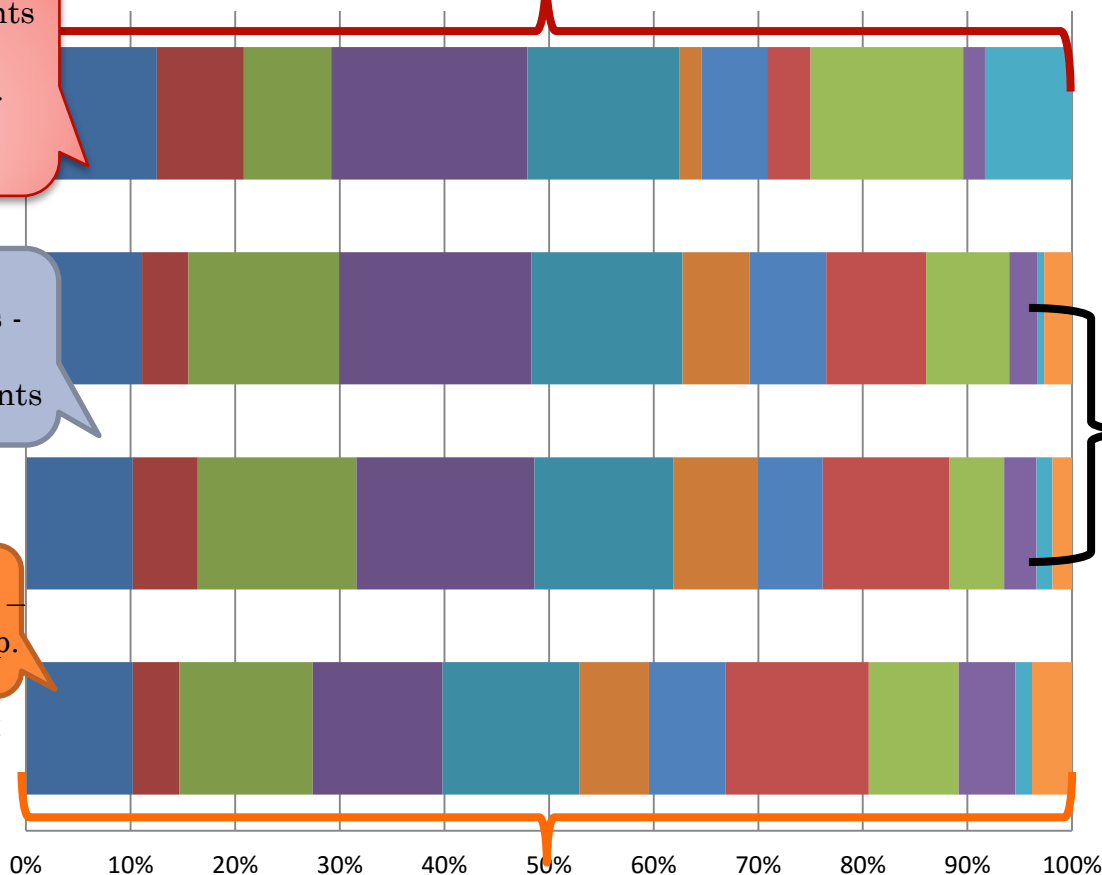
Challenges faced by participants based on experience level

Resistance from parents and colleagues. Grading/Scoring

Similar responses - develop assessments

Varied responses - lack of exp. greatest

- Preparation for National Assessments
- In-school assessment policy
- Curriculum requirements
- Time required to develop assessment
- Time required to implement assessment
- Time required to grade assessment
- Lack of sample tests
- Lack of experience with alternative assessment practices
- Difficulty in developing scoring rubrics
- Resistance from students
- Resistance from parents
- Resistance from colleagues



RESULTS OVERVIEW - INITIALLY

- Participants were uncertain or agreed that they understood inquiry and inquiry assessment
 - Differences based on country and experience level
- Feedback was provided by most teachers sometimes or often.
 - Very experienced with inquiry teachers provided more feedback than those with less experience with inquiry
- There were moderate to strong correlations between their inquiry practices, assessment, and confidence assessing.

RESULTS OVERVIEW - CHANGES

- Understanding of inquiry and understanding of inquiry assessment increased following the programme
- Confidence with assessing inquiry skills increased following the programme
- Due to the correlations between practice, assessment, and confidence, the increase in participants' confidence may indicate an increase in their classroom inquiry practices and assessment
- Beginners with inquiry consider lack of experience with alternative assessments the greatest challenge
- Very experience participants identify resistance from parents as more of a barrier than NE, BE, or SE participants.