THE USEFULNESS OF "MATHS HISTORIES" AS (PART OF) A HOLISTIC ASSESSMENT TOOL

Sonja Beeli, Annegret Nydegger
OVERVIEW

1. Context
2. Threefold assessment
3. Collecting first hand experience
4. Pilot interviews
5. Feedback and first insights
6. Conclusions
CONTEXT

• Adult learners:
  – Heterogeneous group (e.g. Safford-Ramus et al. 2016)
  – (Negative) previous learning experiences (Evans 2000)
  – Test anxiety (ibid.)

• Diagnostic assessment:
  – Purpose of the assessment: inform teacher’s planning
  – Little standardised testing which assesses adult’s basic mathematical knowledge (none in German, Kittel 2016)
THREEFOLD ASSESSMENT

• Maths histories (Archer & Newman 2003)
• Problem solving (Nydegger 2015)
• Talking about mathematics (ibid.)
COLLECTING FIRST HAND EXPERIENCE

Reflect on your personal experiences with mathematics: When were they positive, when were they negative? Draw your mathematical history on the paper provided.
MATHS HISTORIES

• Line graph to illustrate an individual’s relationship with mathematics …

… followed by systematic questions
FOLLOW-UP QUESTIONS

• What happened here?
• Who was involved?
• What mathematical content was involved?
• How did this event influence your learning and using of mathematics?

• When did/do you do mathematics outside of school?
• Is it important in your work? In your private life?

• How should your personal history with mathematics continue?
• What do you need for it to continue the way you want it to?


PROBLEM SOLVING

• Different tasks combined with self assessment

1. What do these percentage rates represent?

2.2

2.4 Fill the boxes.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Decimal Fractions</th>
<th>Common Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>0,4</td>
<td>4/10 = 2/5</td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td>3/4</td>
</tr>
<tr>
<td></td>
<td>0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/20</td>
</tr>
</tbody>
</table>

50% = 50/100 = 1/2

20% =

1% =

75% =

10% =

0,5% =
TALKING ABOUT MATHEMATICS

A

Why can 20% stand for different numbers?
Make an example where 20% correspond to CHF 100.-
Make an example where 20% correspond to CHF 2.-
Make an example where 20% correspond to CHF 10’000.-

Why is this possible?

B

Which is the better offer?
Offer 1  2% on all bought goods plus a reduction of 50.-
Offer 2  4% on all bought goods.

At what price is offer 1 better? When is offer 2 better?

Quelle: Seco, eurostat

7-12 months
more than a year
RESULTS FROM PILOT INTERVIEWS

- Six interviews conducted
- Participants:
  - One secondary school teacher (46 years)
  - Three teenagers (16 years)
  - Two refugees (28 and 33 years)
- Different interviewers (presenters and student teachers)
- Duration of interviews between 7 and 40 minutes
- Recorded on video (hands and paper only, no faces)
EXAMPLE OF AN INTERVIEW SITUATION
FEEDBACK AND FIRST INSIGHTS

- Demanding to implement for both interviewer and interviewee
- Start/instruction for maths history is crucial
- Language based
- (Life) experience relates to preference for different parts of assessment
CONCLUSION

• Threefold assessment works, because …
  …it addresses different dimensions of learning, specifically affective and cognitive dimensions
  …it enables identifying knowledge outside the curriculum, not least of all learning barriers
  …it provides a basis for a positive teacher-student relationship

• Appropriate material for teachers:
LITERATURE


Safford-Ramus, Katherine; Misra, Pradeep Kumar; Maguire, Terry (Eds.) (2016): The Troika of Adult Learners, Lifelong Learning, and Mathematics. Cham: Springer International Publishing (ICME-13 Topical Surveys).