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Innovative teaching and learning
strategies in open modelling and
simulation environment for student-
centered engineering education
Projekt-Nr.: 573751-EPP-1-2016-1-DE-
EPPKA2-CBHE-JP



InMotion



MOOC

Computer-Aided Modeling and Simulation of Event-Continuous Systems

MOOC Overview



- Developed by UNED, UL, NSTU;
- Deployed in the OMSE;
- Covers the basics of mathematical and computer modeling and simulation;
- No prerequisites, although skills in numerical methods and physics are highly recommended;
- Available from May 13th to September 15th, 2019.

MOOC Content

- 3 sections: Dymola/OpenModelica, Matlab/Simulink, ISMA;
- Textual and video materials, virtual laboratory benches;
- Tests and non-assessed assignments.

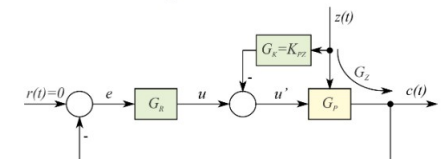


Fig. 4.2. Proportional type of the feed forward compensation

Cascade control represents one of the most frequently used multi loop control systems. Basic principle is shown in Fig. 4.3.

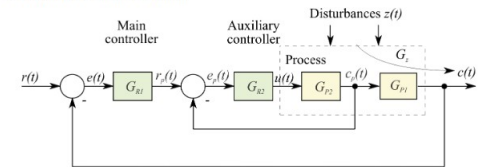


Fig. 4.3. Cascade control

In addition to the controlled variable $c(t)$ also the auxiliary variable $c_p(t)$ is measured. Therefore two controllers connected in cascade are used. Only the first one has adjustable reference. By the aid of the error $e(t) = r(t) - c(t)$ the output of the main controller is calculated. However, it is not the control variable as usually, but it represents the reference for the auxiliary controlled variable $c_p(t)$. The mentioned reference is compared with the auxiliary

ISMA

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Part 1 of 5 -

Question 1 of 5

1.0 Points

Given the equations with initial conditions

$$y_1' = y_1 + y_2,$$

$$y_2' = 2y_1 - 3y_2,$$

$$y_1(0) = y_2(0) = 1,$$

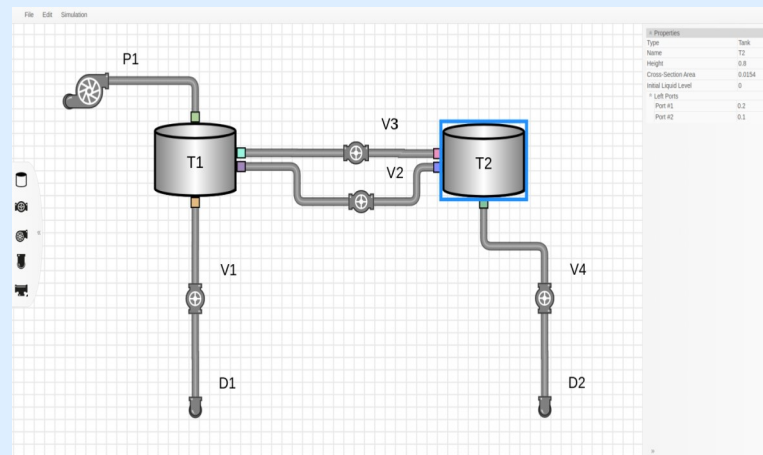
choose their descriptions in the LISMA language.

- A. $y_1' = y_1 + y_2; y_2' = 2y_1 - 3y_2; y_1(0) = y_2(0) = 1;$
- B. $y_1' = y_1 + y_2; y_2' = 2y_1 - 3y_2; y_1(0) = y_2(0) = 1;$
- C. $y_1(t_0) = 1; y_2(t_0) = 1; y_1' = y_1 + y_2; y_2' = 2y_1 - 3y_2;$
- D. $y_1(t_0) = 1; y_2(t_0) = 1; y_1' = y_1 + y_2; y_2' = 2y_1 - 3y_2;$

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3.a. Electrical Library (Video)

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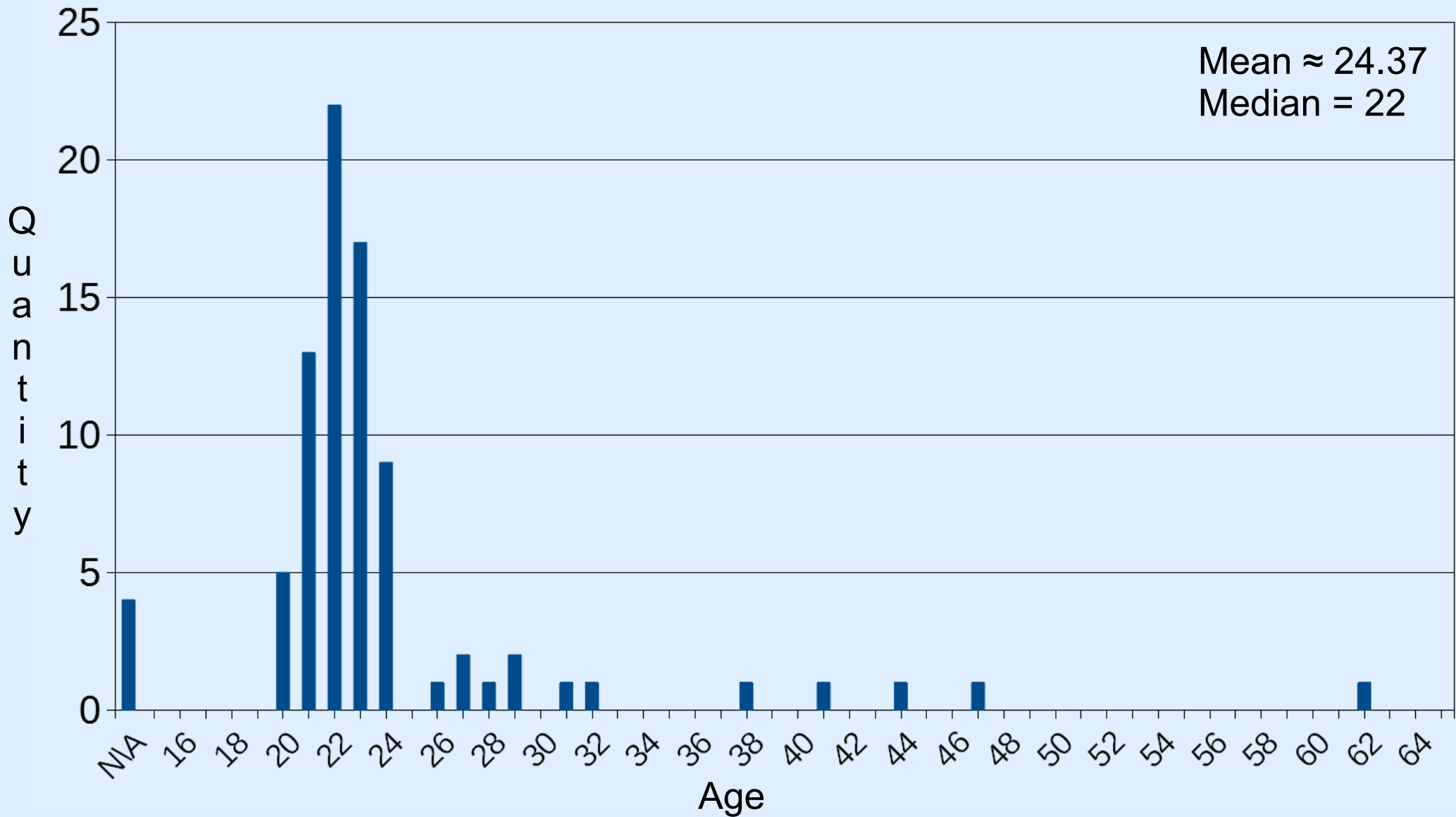
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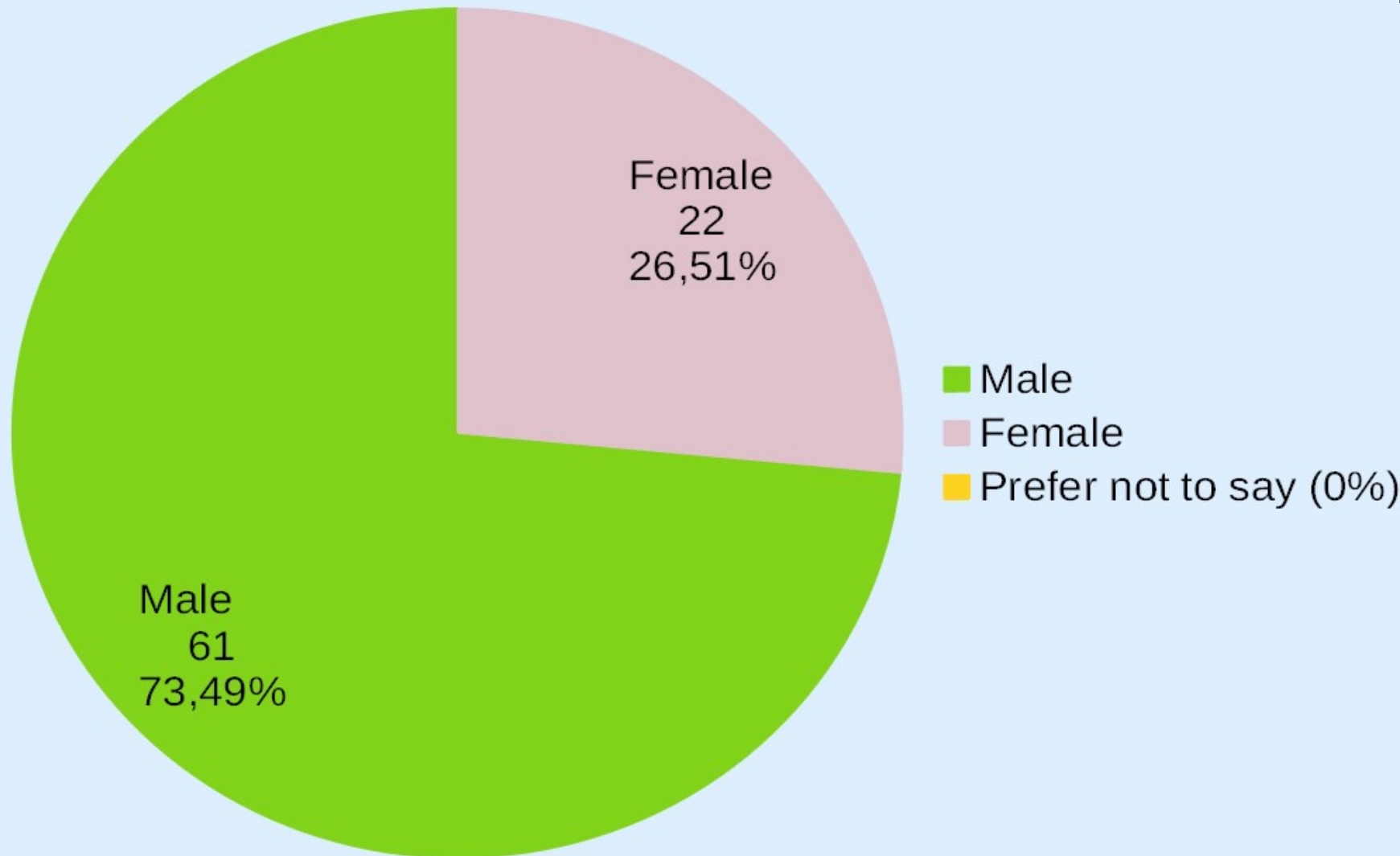
General Indicators

- 83 enrolled students;
- 16 MOOC completions (~19%);
- 4 countries.

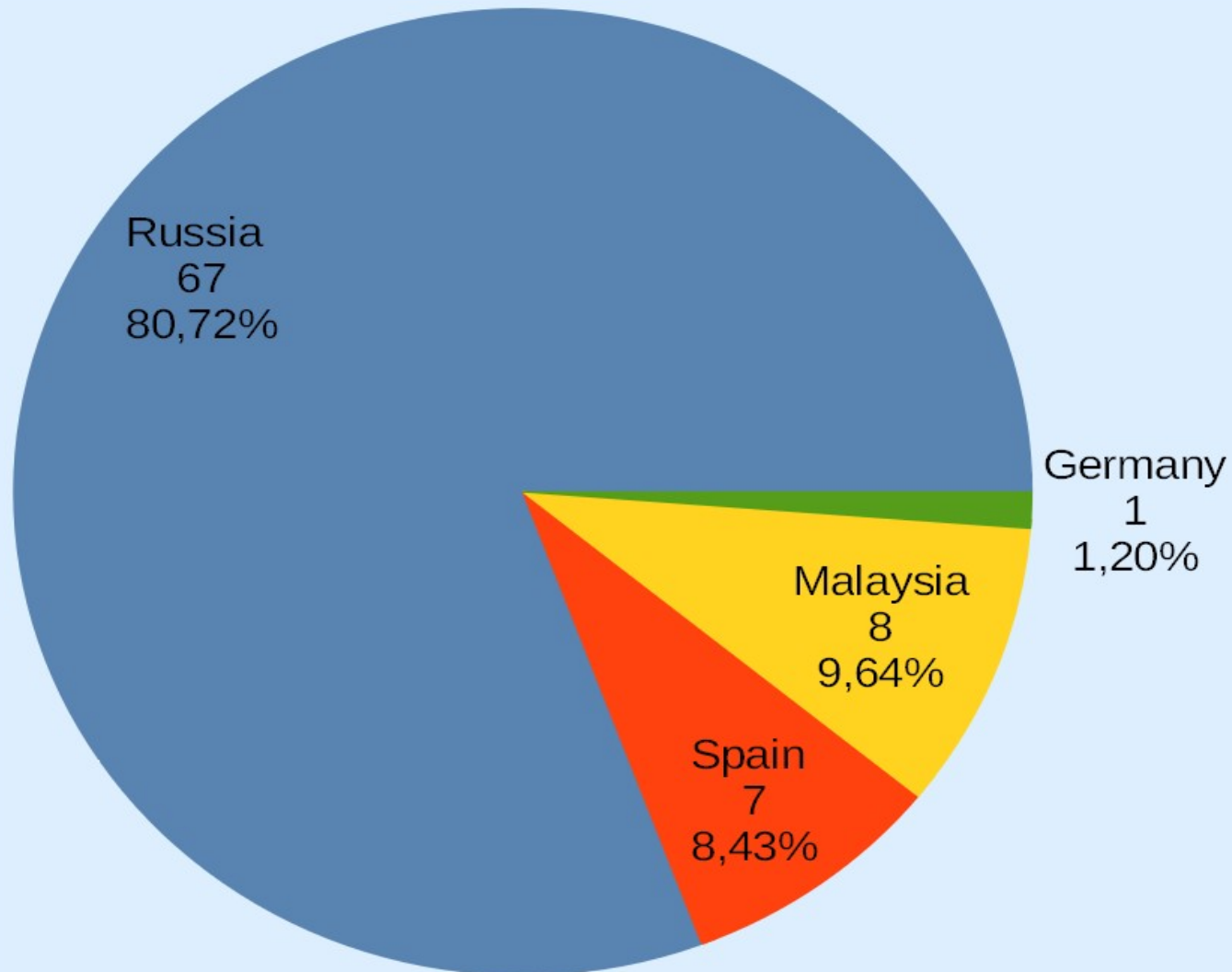
Students' Age



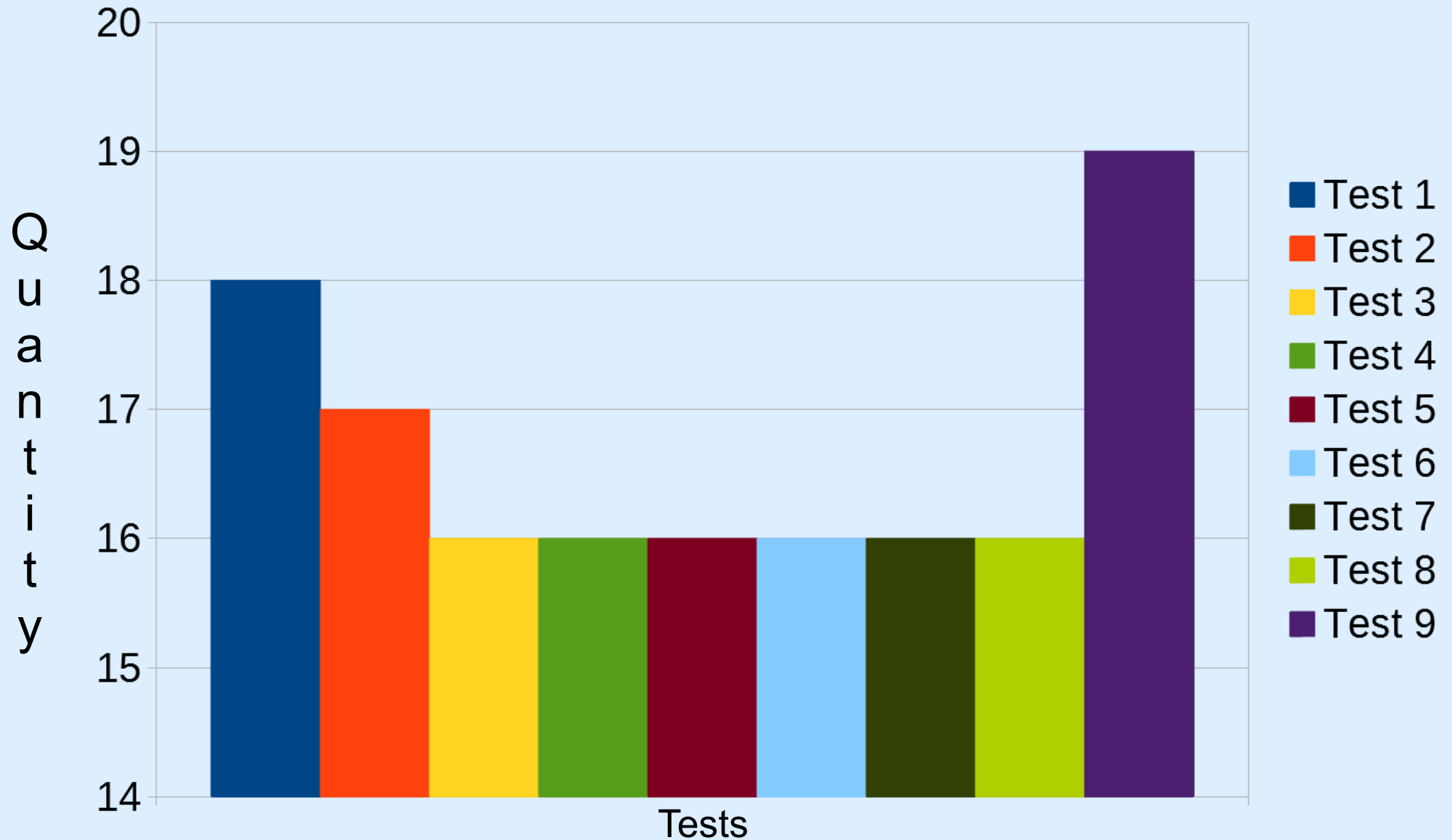
Students' Gender



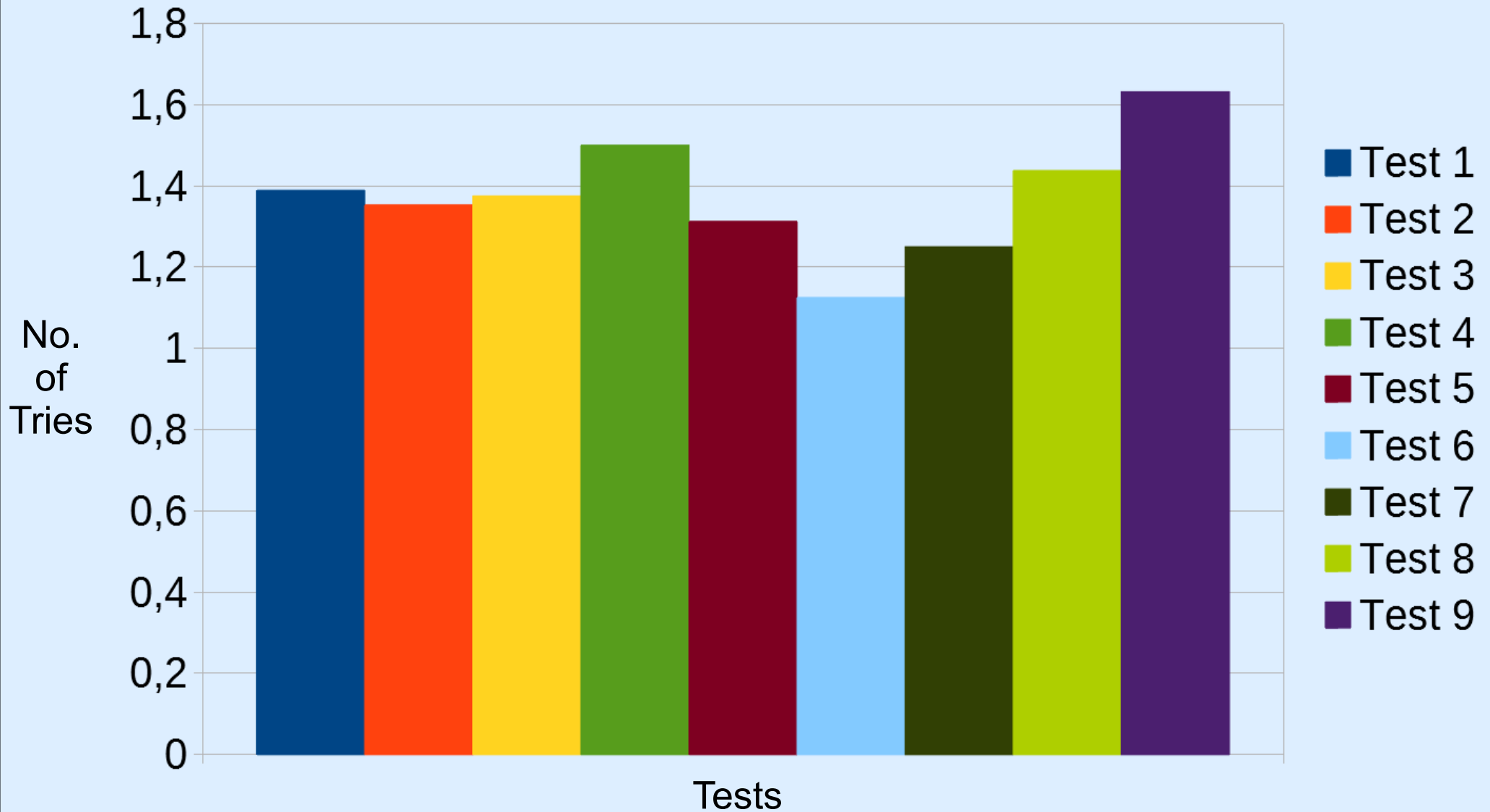
Students' Nationality



Students Successfully Completed Tests



Number of Tries Needed to Pass Tests



MOOC Evaluation

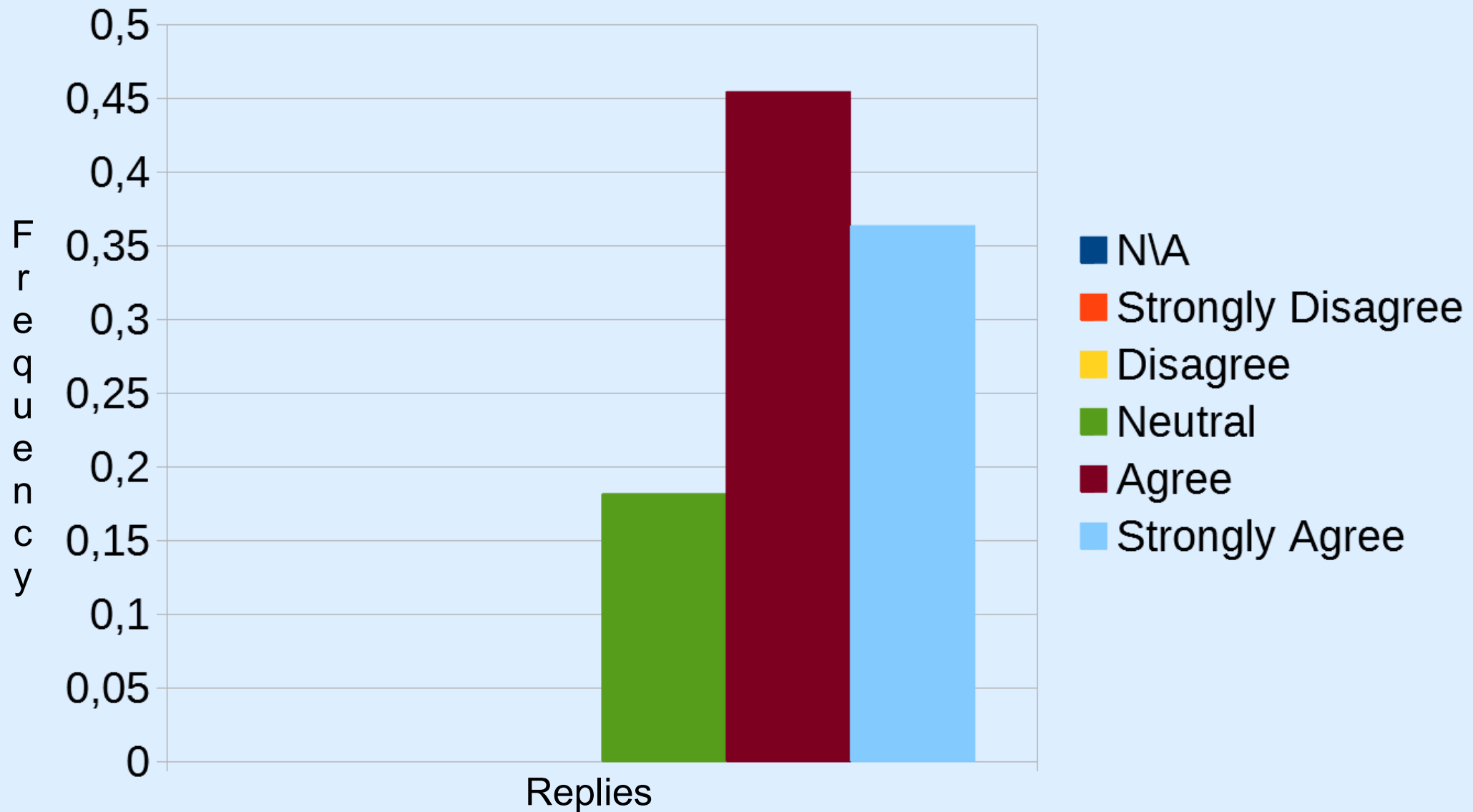
- Evaluation questionnaire:

Questionnaire for the <i>Computer-Aided Modeling and Simulation of Event-Continuous Systems</i> MOOC						
STATEMENTS	RESPONSES					
<i>Instructions: For each of following statement select the response that most closely expresses your opinion. N\A stands for Not Applicable.</i>						
LEARNING						
1) I have found the course intellectually challenging and stimulating.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2) I have learned something which I consider valuable.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3) My interest in the subject has increased as a consequence of this course.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4) I have learned and understood the subject materials of this course.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5) The virtual laboratory benches enhanced my understanding of the course materials.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ORGANIZATION						
6) Instructor's explanations were clear.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7) Course materials were well prepared and carefully explained.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8) Proposed objectives agreed with those actually taught so I knew where the course was going.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ASSIGNMENTS						
9) Required readings/texts were valuable.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10) Further readings, tasks and auto-evaluation formularies contributed to appreciation and understanding of subject.	N\A	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
OVERALL						
11) As overall rating, I would say the course is:	N\A	Very Poor	Poor	Average	Good	Very Good
COMMENTS/FEEDBACK						
12) Please, provide any additional comments or feedback.	Text (Max. 4000 characters)					

- 11 replies have been received (50%).

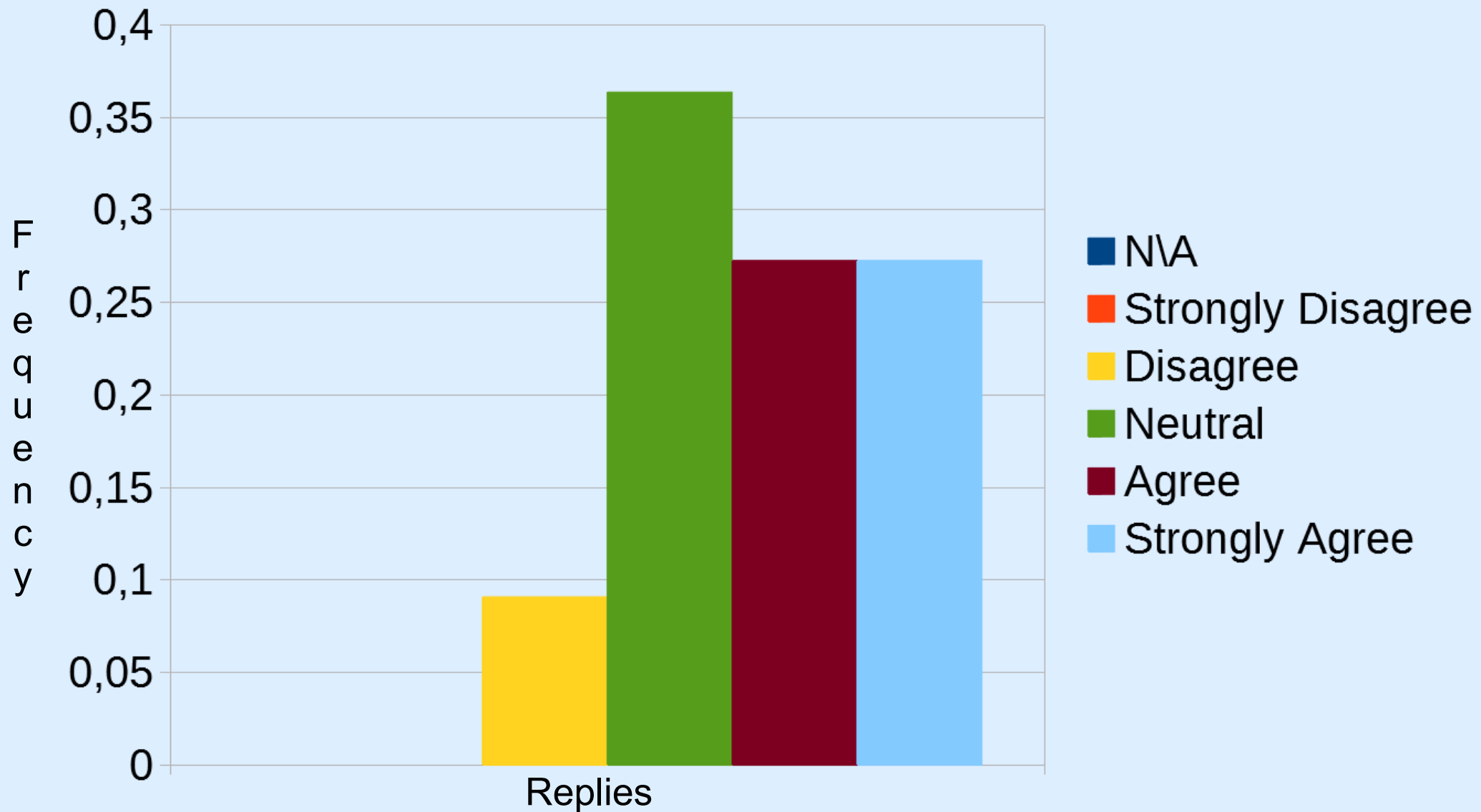
Evaluation Results. Question 1.

I have found the course intellectually challenging and stimulating.



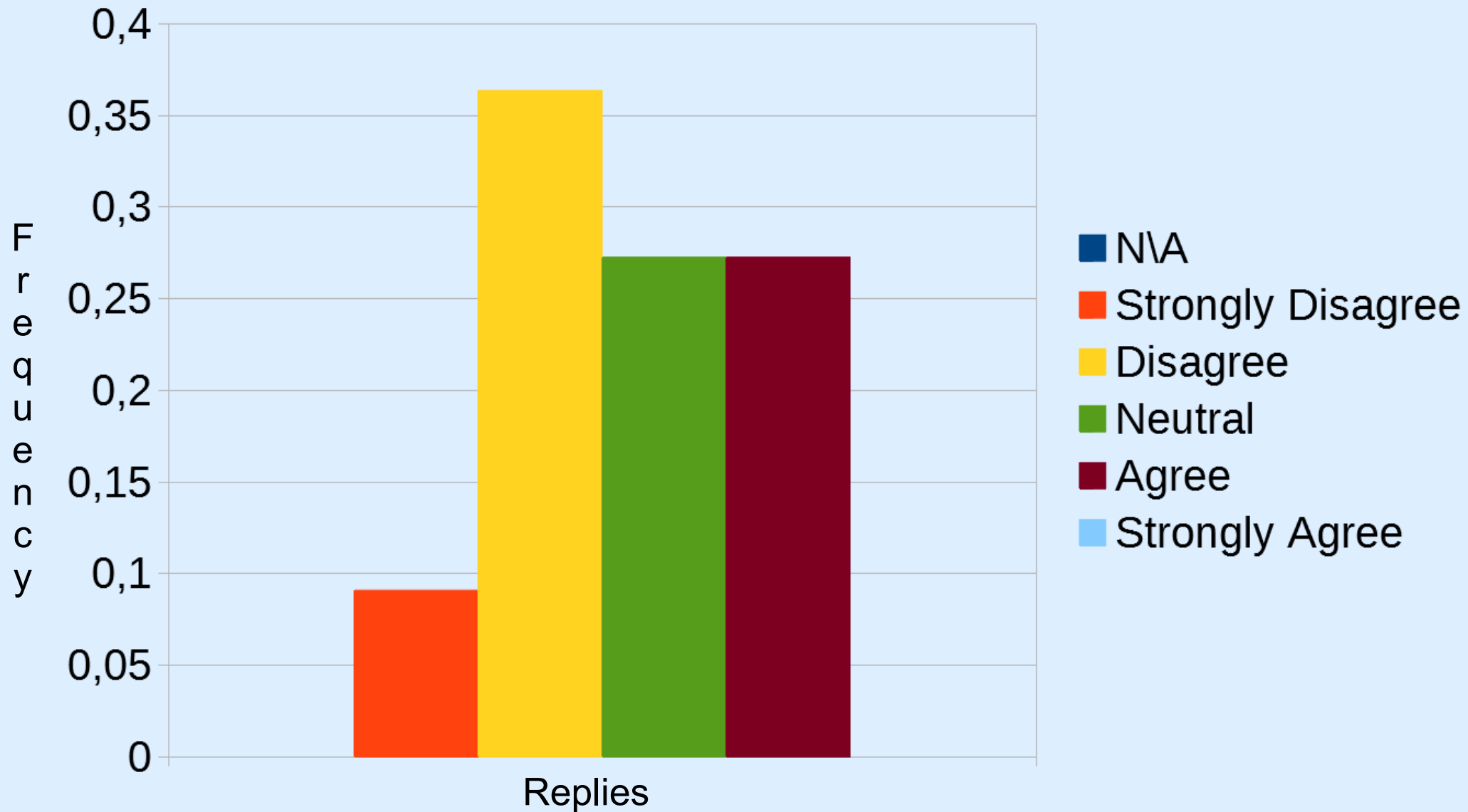
Evaluation Results. Question 5.

The virtual laboratory benches enhanced my understanding of the course materials.



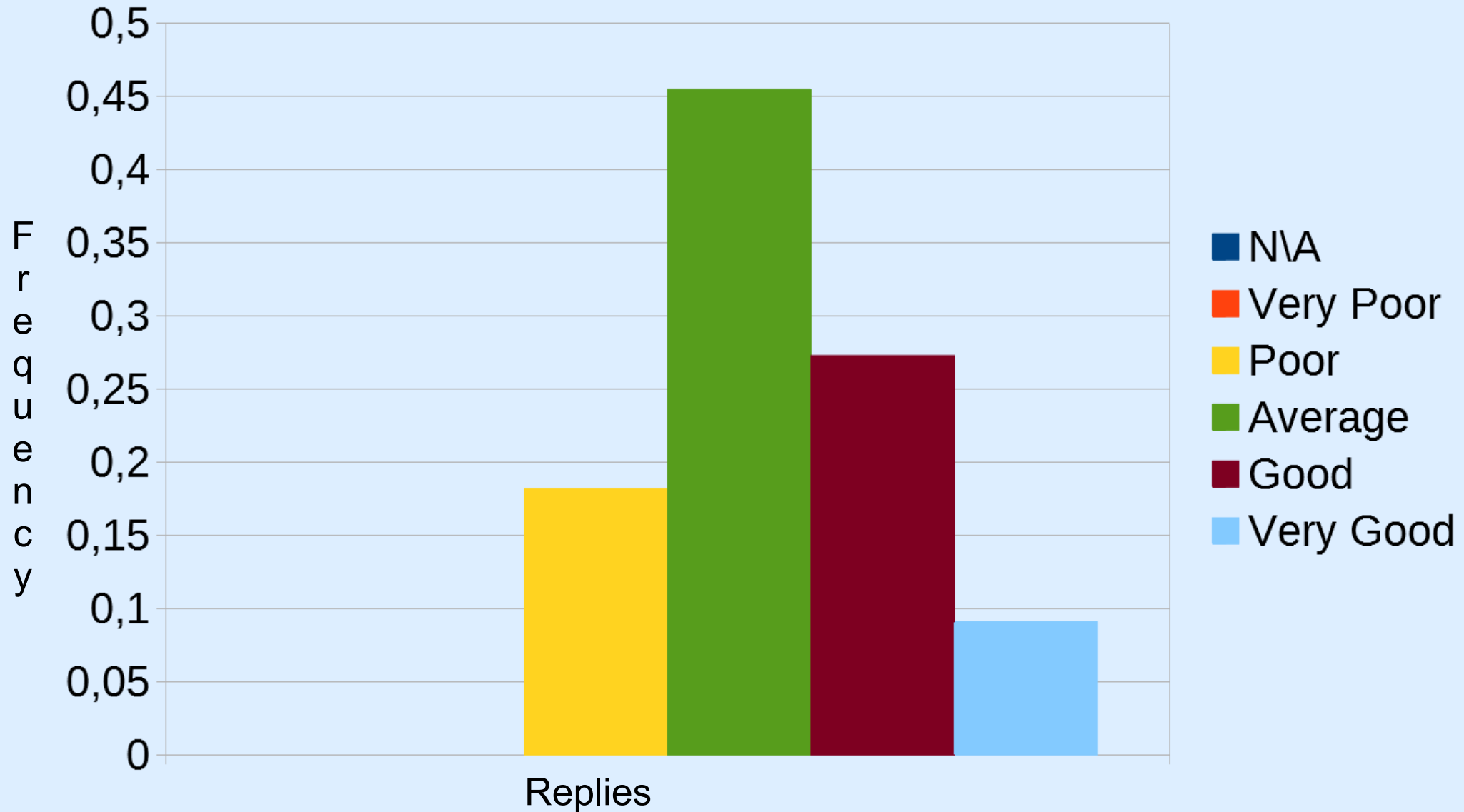
Evaluation Results. Question 7.

Course materials were well prepared and carefully explained.



Evaluation Results. Question 11.

As overall rating, I would say the course is:



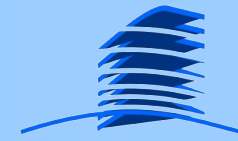
Future Plans

- Add subtitles in English, Russian, and Spanish;
- Add more virtual laboratory benches;
- Enhance the explanation of the materials.



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