Aalto University
School of Electrical
Engineering

Aalto University
School of Science

A Group Forming Algorithm

- Group work
- Intention behind group work
- "Upping the ante"
- A broad interpretation of multiculturalism
- Parametrisation
- An algorithm
- Implementation
- Ouch! (Conclusions)

TYYLI

Elinkeino-, liikenne- ja ympäristökeskus

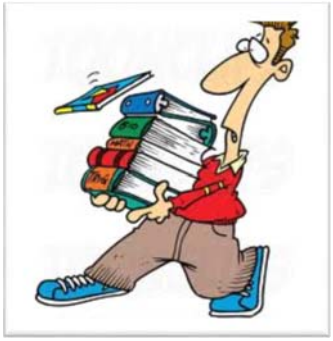
Vipuvoimaa EU:lta 2014–2020

Euroopan unioni
Euroopan sosiaalirahasto

Group work

Teacher's perspective

- *limited resources/time: easier if students form groups than decide which students form a group*
- *limited multicultural competence, forming optimal groups impossible*
- *many other learning goals in a course, how to still reach all?*
- *needs convincing to force groups against wishes of students*
- *lack of competence in handling the social and psychological consequences of forced grouping*



Group work

Student's perspective

- *convenience of mother tongue: English (as a foreign language) may create a communication barrier*
- *feeling of safety: existing social networks usually homogenous*
- *fear of "free-riders"*
- *development of trust harder if from different backgrounds*
- *work attitudes/expectations may be different, culturally-dependent*
- *too many simultaneous tasks*
- *scepticism from students in working life*

Intention(s) behind group work

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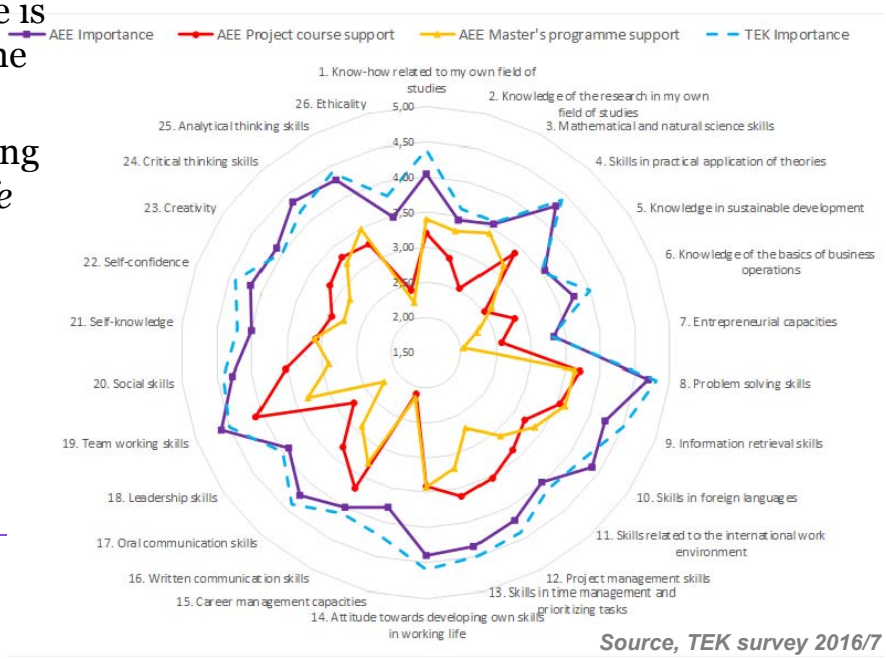
- "The sum of the whole is greater than sum of the parts"
- Preparation for working life, i.e., a *working life skill* that potentially contains many other working life skills:
- Deep learning and unfolding
- Networking…



Source, TEK survey 2016/7

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"Upping the ante"

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Purposively forming groups to best perform a task is very pragmatic, as it can cut through conditioned boundaries and expose agreed fictions

Purposively forming groups to be as **culturally** diverse as possible can be a recipe for both awakening and disaster!

A broad interpretation of multiculturalism

- **Nationality/ethnicity/skin colour/religion/...**

PEANUTS!

(*well, not if you're on the receiving end of some of the behaviour that is becoming sanctioned these days...*)

- **Personality**
- **Gender**
- **Academic background**
- **Work experience**

Parametrisation

- **Country of origin or country with largest imprint in your life**
- **Personality**
  - We've based the first version of the algorithm on the 'Big 5' – with some reservations
- **Gender:** other, female, male
- **Academic background** (in terms of distance from most relevant background)
- **Work experience**

t work...

1. This questionnaire contains questions that are personal, and your answers will be kept anonymous.
   If you are willing to participate in the questionnaire to aid the formation of assignment groups that are as diverse and interesting as possible, mark "Yes".
   If you are unwilling to participate, please mark "No".
   If you have marked "Yes", but find one or more of the questions unacceptable, just leave the questions you don't want to answer unanswered!
2. Please enter the number that corresponds to your country of greatest influence – if your country is not listed here, select the country with the closest teacher and notify the teacher! Enter 0 if you are not prepared to answer this questions
3. In a student group context, do you tend to be active (extravert) **OR** more passive (introvert)?
4. In a group setting, do you tend to be easy-going (agree, mediate, be 'nice') **OR** hypercritical (i.e., point out faults in yourself and/or others, challenge, suspect)?
5. Do you tend to feel calm and relaxed **OR** anxious and worried with others?
6. Do you tend to be conscientious and on time, **OR** more spontaneous and tend to be late?
7. Do you like experiences **OR** do you prefer predictability and dealing with what you are familiar with?
8. Are you male, female or other?
9. This scale is a playful attempt for you to assess how appropriate your previous education is for the assignment. 5 means you have passed Power Systems or some equivalent subject and 1 indicates that you feel your education is in quite another area – but you are especially valuable!

An algorithm – engineers at work...

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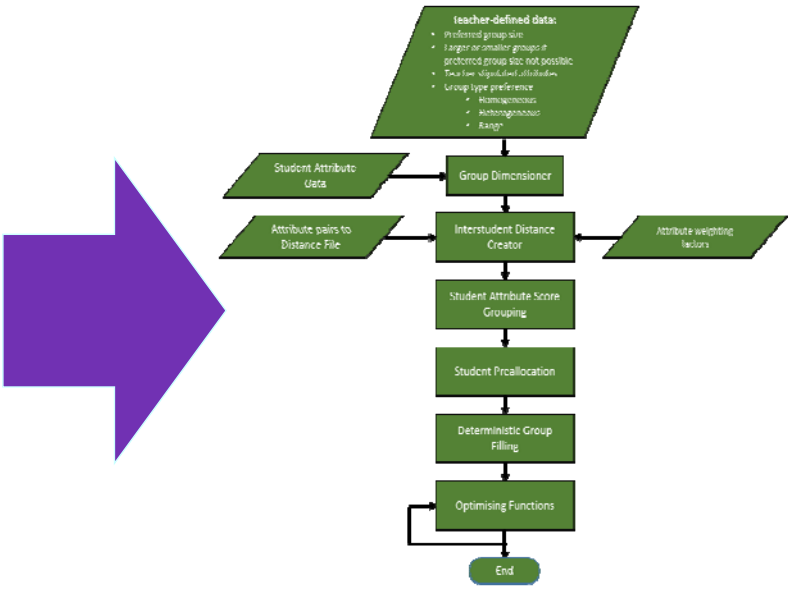


Implementation

Dashboard / My own courses / elec-e8406 - ... / Course home page / questions for...

Questions for group forming algorithm to process

This is a series of questions to aid the formation of heterogeneous (or homogeneous) groups according to your nationality, the way you tend to behave in group situations, your gender, academic background and work experience.

- You are free to opt out of the questionnaire totally, or in part, if you feel uncomfortable with divulging certain information, or disagree with the entire idea! No problem! The algorithm will use whatever parameters you are happy to provide, or just randomly assign you to a group if there is no information given.
- Whilst John would like to use the data in pedagogical research, any information given will not be linked to any individual student. Your anonymity is guaranteed!
- Some information about how the algorithm works will be requested, in terms of its: success in forming heterogeneous or homogeneous groups, the impact of these formations on student learning and group/team/multicultural working life skill development... This information will also be kept entirely anonymous.

When subjectively assessing your behaviour, do it with respect to group work at university. None of this stuff 'marks' you for life - just a most-likely response for a particular activity at a particular time in your life! Treat it as a playful exploration!
The questionnaire was closed on Friday, 26 January 2018, 11:00 PM. Thanks.
View All Responses

Implementation

Advanced settings | Questions | Preview | View All Responses | Non-respondents

Summary | List of responses

View Default order | Ascending order | Descending order | Delete ALL Responses | Download in text format

View All Responses. **All participants**. View Default order Responses: 76

Questions for group forming algorithm to process

1 This questionnaire contains questions that are personal, and your answers will be kept anonymous.

If you are willing to participate in the questionnaire to aid the formation of assignment groups that are as diverse and interesting as possible, mark "Yes".

If you are unwilling to participate, please mark "No".

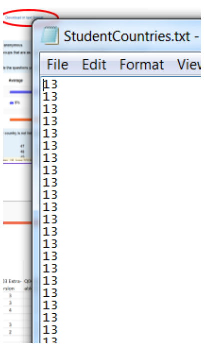
If you have marked "Yes", but find one or more of the questions unacceptable, just leave the questions you don't want to answer unanswered!

Response	Average	Total
Yes	95%	72
No	5%	4
Total	100%	76/76

2 Please enter the number that corresponds to your country of greatest influence - if your country is not listed here, select the country with the closest culture and notify the teacher! Enter 0 if you are not prepared to answer this question.

1	Israel	24	Ecuador	47	Australia
2	Belgium	25	Mexico	48	Ireland
3	France	26	Venezuela	49	Nigeria

Implementation

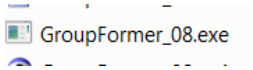


e.g.

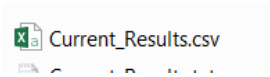
ull name	Q01 Willingness to participate	Q02 Nationality	Q03 Extra-version	Q04 Agree-ableness	Q05 Neuro-ticism	Q06 Conscien-tiousness	Q07 Openness to experience	Q08 Gender	Q09 Aca-demic back-ground
	1	13	3	2	2	2	3	3	4
	1	13	3	3	3	4	2	3	4
	1	13	4	2	3	2	4	3	5
	0								
	1	13	3	1	3	2	3	3	4
	1	13	2	3	2	1	2	3	4
	0								
	1	13	4	2	3	2	2	3	4
	1	13	4	1	2	2	4	3	4
	0								
	1	13	4	2	4	1	5	3	5
	1	13	4	4	4	2	4	3	4
	1	13	4	2	4	2	4	2	4
	1	13	2	4	5	1	5	3	5
	1	13	2	2	2	1	2	3	5
	1	13	4	1	4	2	4	3	4
	1	13	3	2	2	1	4	2	5
	1	13	2	2	4	2	3	3	4
	1	26	3	2	2	1	2	3	4
	1	13	3	3		3	3	3	3
	1	13	5	4	4	3	4	3	4
	1	13	2	2	1	2	4	2	4
	1	13	2	4	4	2	3	2	5
	1	13	4	4	4	1	4	3	4

Implementation

Run algorithm



Open Current_Results:



No. of preallocatedAttributes =								
2								
Average of all interstudent distances =								
40								
	Member 1	Member 2	Member 3	Member 4	Member 5	Member 6	Tot dist	Ave dist
Group 1	26	22	53	6	7	12	631	42
Group 2	34	8	57	29	56	0	798	53
Group 3	38	1	4	23	30	15	617	41
Group 4	39	11	31	2	50		480	48
Group 5	40	16	33	19	27		560	56
Group 6	42	9	49	41	14		490	49
Group 7	43	21	54	28	20		520	52
Group 8	44	35	55	25	36		490	49
Group 9	45	18	5	46	10		130	13
Group 10	47	51	37	13	32		540	54
Group 11	48	52	24	3	17		540	54
gTotalAllG	5796							
							Average Ave:	46.45455

Ouch! (Conclusions)

- **The algorithm could use some work on the interface!**
- **The algorithm still has a better optimising routine coming...**
- **This kind of social engineering goes beneath the skin!**
- **It is essential, if purposively creating diverse groups, which this algorithm does quite effectively, despite the margins of error in the parametrisation, to provide:**
  - Initial guidance at class and group level to prepare students for challenges that may arise, and to turn those into learning and growth experiences
  - Support when needed – check-in sessions for all groups, open door policy for groups that need extra support