

Introduction to SNA and mixed methods triangulation



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Many Thanks ...



- Nienke Moolenaar, Universiteit Utrecht, the Netherlands
- Alan J. Daly, University of California, San Diego, USA
- Brian V. Carolan, Montclair State University, USA
- Steve Borgatti, Rich DeJordy, Tom Snijders, and Tom Valente
- Dominik Froehlich and Martin Rehm
- SNA courses we have taken and taught these past several years

Think-Pair-Share



- Turn to your first neighbor
- 1) learning goals for this “workshop”;
- 2) what brought you here, and:
- 3) your experience working with SNA and qualitative methods



Triangulation

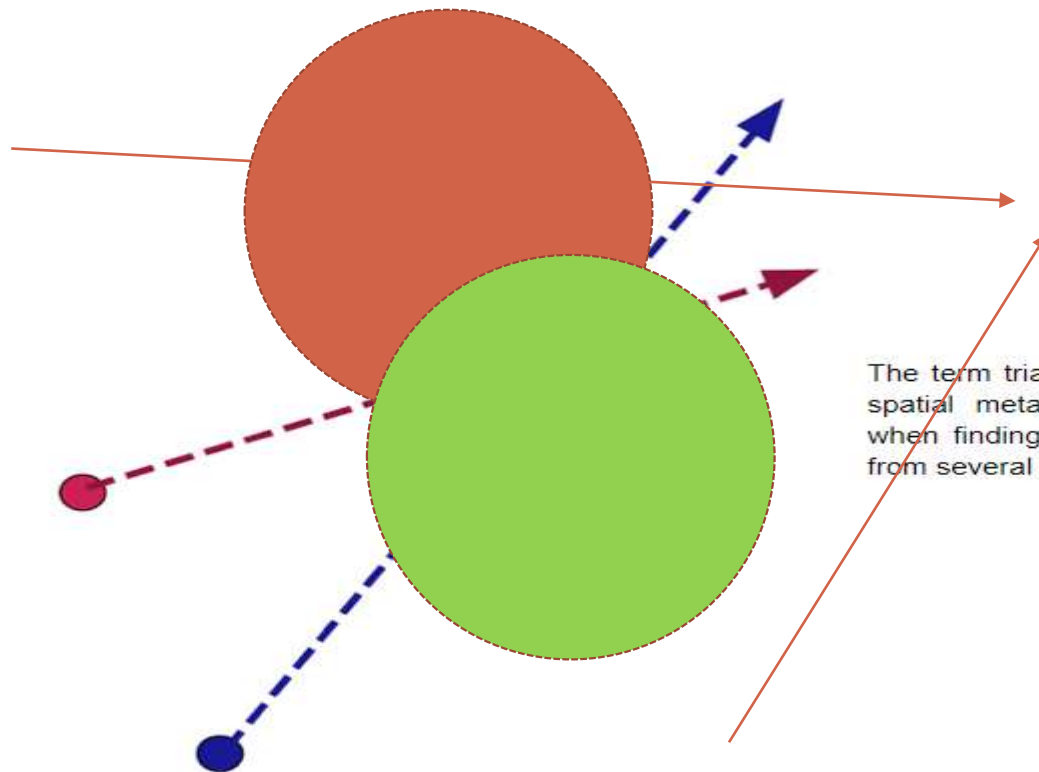


- So what is triangulation, and why might this be relevant?

How to mix SNA with mixed methods



Triangulation



The term triangulation derived from a spatial metaphor - a method used when finding a location by observing from several vantage points

How to mix SNA with mixed methods



- Provide counter-perspectives
- What actually happens?
- What is actually shared?

Typical questions:

- Why is there a link between A-B?
- Why does a network change over time?
- Why is person X now more central?
- Why is group X not connected to group Y



Four case-studies and what I have learned



- EXEMPLAR 1: Combining “Objective” Closed SNA data with content analysis
- EXEMPLAR 2: Closed “Subjective” SNA WITH interviews and focus groups
- EXEMPLAR 3: Open “Subjective” SNA APPROACH WITH follow-up in-class discussions
- EXEMPLAR 4 Closed SNA WITH case studies

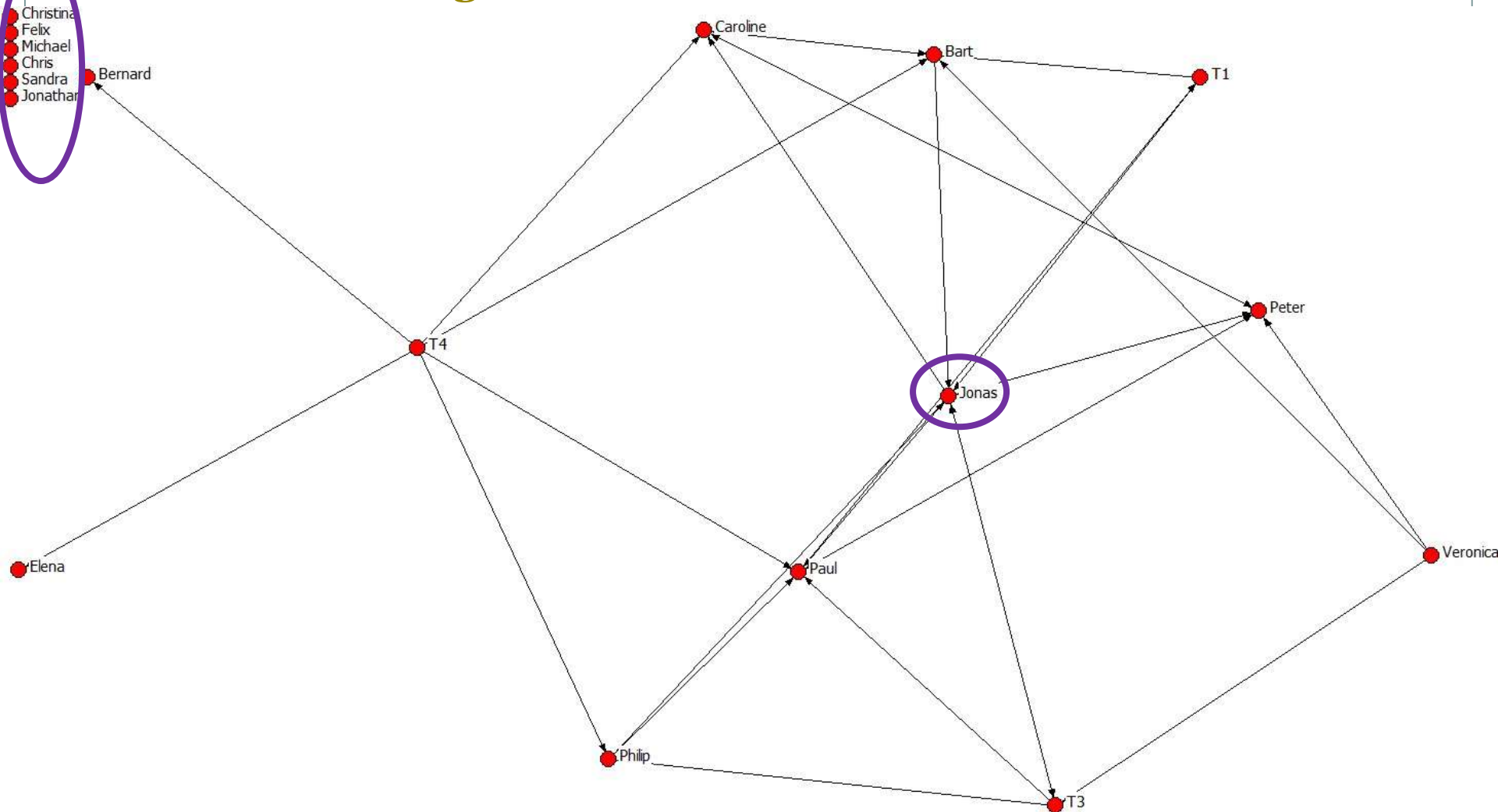
EXEMPLAR 1: COMBINING OBJECTIVE SNA DATA WITH CONTENT ANALYSIS



- Online summer course run in Maastricht from 2005-2013 (Rienties, 2010; Rienties et al., 2014; Rienties et al., 2009)
 - Which types of motivated students were more inclined to contribute to online discourse, and higher cognitive discourse in particular when working together in discussion forums.
1. Objective SNA data from the interaction patterns in discussion forums of 82 participants and 1800 messages , whereby we calculated both Freeman's degree of Centrality (Wassermann & Faust, 1994) as well as ego network density of each individual within the network.
 2. Content analysis to determine what students were actually talking about in the online summer course.
 1. Veerman and Veldhuis-Diermanse (2001), which distinguished between non-task related (1 = "planning;" 2 technical; 3 social; 4 non-sense) and task-related discourse activity (5 facts; 6 experience/opinion; 7 theoretical ideas; 8 explication; 9 evaluation).
 3. Individual motivation was measured by the Academic Motivation Scale by Vallerand et al. (1992), which distinguished three intrinsic motivation scales, three extrinsic motivation scales, and one a-motivation.

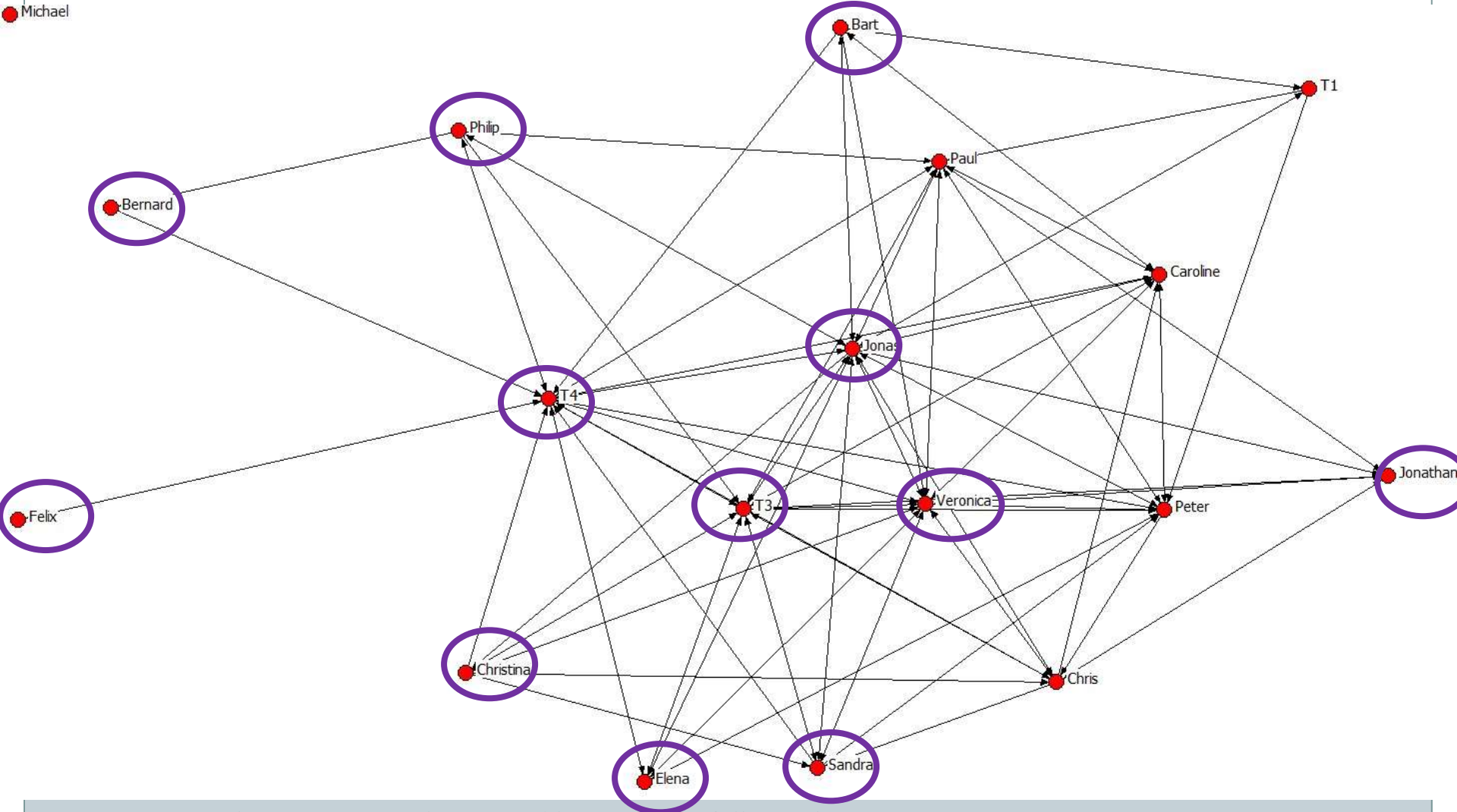
Social interaction in week 1:

Why are some learners more active in contributing to discourse in online settings than others?



Jonas central after 1st week of discussions
9 students participate, 6 do not participate

Social interaction in week 1-6



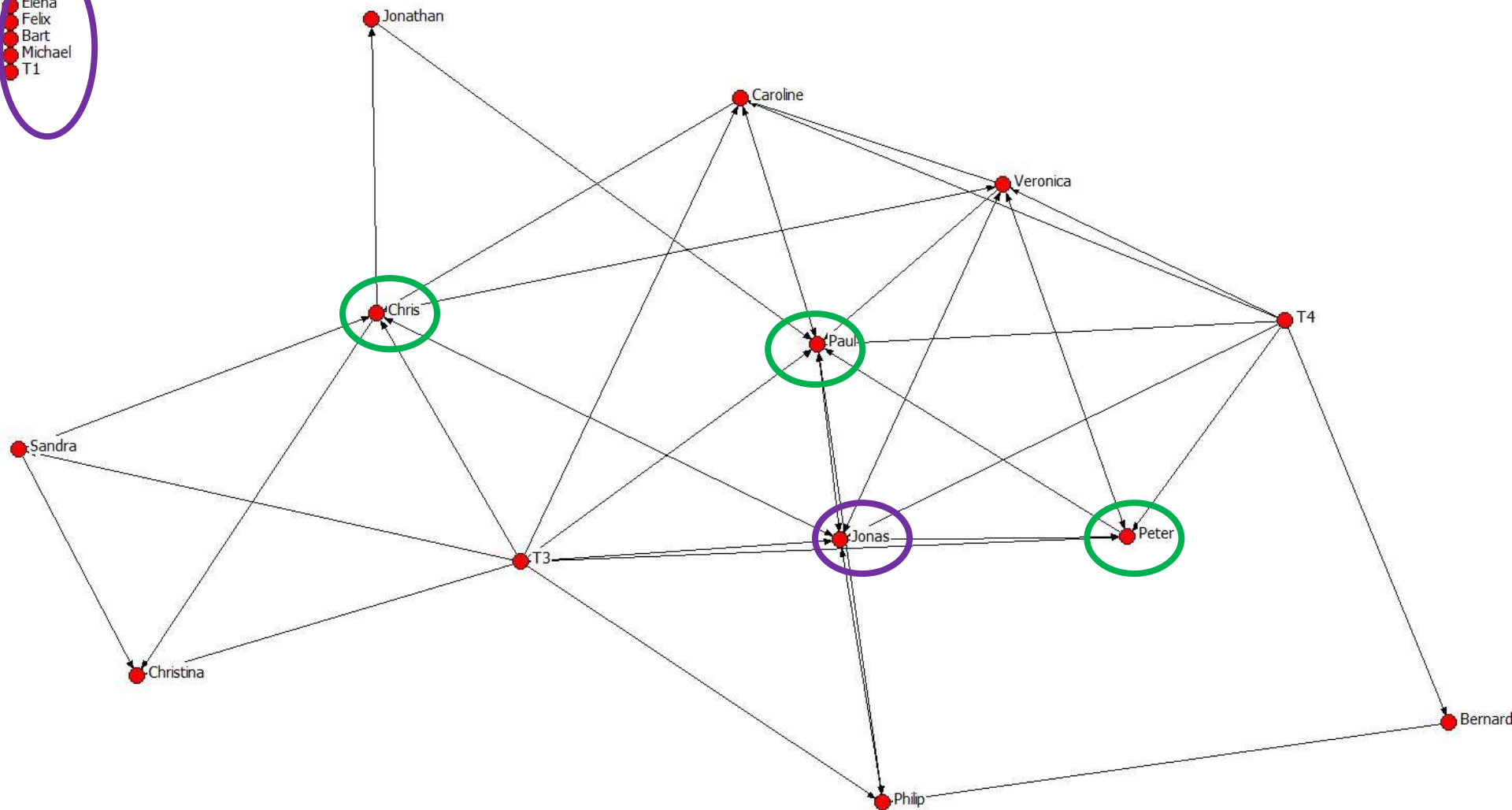
Jonas, Veronica, Tutor 3 and 4 central in 6 weeks of discussions

14 students have participated, 1 student does not participate

Several students on outer ring of social interaction (Bernard, Felix, Philip, Christina, Elena, Sandra, Jonathan, Bart)

Higher Cognitive Discourse in week 1-6: Why do learners differ in their contributions to the type of

- Elena
- Felix
- Bart
- Michael
- T1



Paul, Jonas and Chris central in higher cognitive discourse in week 1-6
11 students contribute to higher cognitive discourse, 4 do not.

Results I Social and cognitive discourse related to motivation

	IMTK	IMTA	IMES	EMID	EMIN	EMER	AMOT
<i>Content Analysis</i>							
<i>Non-task related</i>	0.14	0.17	0.18	-0.02	0.03	0.01	0.17
Planning (Cat. 1)	0.21	0.24*	0.24*	0.07	0.07	0.04	0.06
Technical (Cat. 2)	0.22	0.21	0.26*	-0.06	0.07	-0.05	0.07
Social (Cat. 3)	0.17	0.10	0.12	-0.28*	-0.03	-0.29*	-0.13
Nonsense (Cat. 4)	0.08	0.12	0.12	0.02	0.02	0.06	0.21
<i>Task-related</i>	0.27*	0.24*	0.23*	0.03	0.00	-0.05	-0.09
Facts (Cat. 5)	0.23*	0.18	0.18	-0.05	-0.10	-0.13	0.00
Experience (Cat. 6)	0.29*	0.28*	0.28*	0.10	0.03	-0.02	-0.14
Theoretical Ideas (Cat. 7)	0.22	0.23*	0.26*	0.01	0.11	0.03	-0.05
Explication (Cat. 8)	0.26*	0.25*	0.20	0.07	0.04	-0.01	-0.14
Evaluation (Cat. 9)	-0.10	-0.08	-0.20	0.03	0.01	0.09	-0.08

*Correlation is significant at the 0.05 level (2-tailed).

Intrinsically motivated students contribute more to task-related communication

Extrinsically motivated students contribute “on average” but lower on social contributions, which is important for group development

(Barron, 2003)

Results II Network position related to motivation

	IMTK	IMTA	IMES	EMID	EMIN	EMER	AMOT
<i>Social Network Analysis</i>							
Reply Degree	0.23*	0.21	0.18	0.00	0.00	-0.03	0.05
Reply TR Degree	0.27*	0.21	0.18	0.01	-0.04	-0.07	-0.12
Reply HC Degree	0.27*	0.24*	0.20	0.11	0.06	0.05	-0.16
Size	0.24*	0.21	0.22	-0.01	0.04	0.05	-0.02
TR Size	0.29*	0.26*	0.23*	-0.02	0.05	-0.03	-0.08
HC Size	0.29*	0.29*	0.24*	0.13	0.05	0.04	-0.12

*Correlation is significant at the 0.05 level (2-tailed).

- Intrinsically motivated students are more in the center of the social network
- Intrinsically motivated students have more connections
- Extrinsically motivated students are scattered throughout the network

Limitations



- What could I have done differently?

EXEMPLAR 1: COMBINING OBJECTIVE SNA DATA WITH CONTENT ANALYSIS



- Although the content analysis could be regarded by some to be a qualitative approach, which of course is dependent on the coders and the respective coding scheme, in a way Exemplar 1 is probably an example of a mixed quantitative SNA approach.
- Analysing over 2,000 messages by hand by three independent coders was a substantial amount of work, as well as integrating the various datasets.
- One wonders whether a simple closed network survey at the end of the module with a question like “from whom have you learned the most about economics during this online summer course” might have been easier.
- In addition, we did not specifically ask why some participants were more inclined to contribute to (higher cognitive) discourse, and why others were not contributing to discourse.
- Follow-up interviews based upon participants’ network positions would have provided interesting (counter)supportive perspectives.

EXEMPLAR 2: CLOSED SNA WITH INTERVIEWS



- Elective post-graduate module of 207 students in Organisational behaviour in the UK in 2011 (Rienties, Héliot, & Jindal-Snape, 2013).
 - The primary aim of this study was to understand how 191 international students from 34 cultural backgrounds and 16 UK students built learning, working, and friendship relations over time.
 - Students were enrolled in small groups and were expected to work face-2-face in discussion forums on case-studies before the next lecture.
1. Pre-existing friendship, work, and learning relations using closed SNA in week 4, and repeated this at the end of the module at week 11.
 2. A range of matrixes were created to control for pre-existing networks (i.e., friend, learn, work at M1), as well as demographics (i.e., co-nationality, Chinese), and teaching related factors (i.e., group division, specialisation).
 3. Follow-up focus groups one month after the module with two groups was completed based upon the (lack of) interaction in the online team forums.

Limitations



- What could I have done differently?

EXEMPLAR 2: CLOSED SNA WITH INTERVIEWS



- In comparison to Exemplar 1, the amount of time required to collect and analyse data in this Exemplar 2 was relatively limited.
- A particular useful feature to ensure that we passed the response rate of > 80% was to distribute the pre- and post SNA in the actual lecture by the teacher, who actively encouraged students to participate.
- Furthermore, students received individualised (semi-automated) feedback on their network results and the results of the SNA were discussed during the next lecture, which was an additional incentive for students to participate.
- Although the triangulation of the SNA with data from the focus groups was useful, one of the drawbacks of inviting all participants of the respective group was that individual voices at times were lost. In particular UK students and international students with strong English language mastery often contributed during the semi-structured focus groups, even though specific attempts were made to be inclusive.

EXEMPLAR 2: CLOSED SNA WITH INTERVIEWS



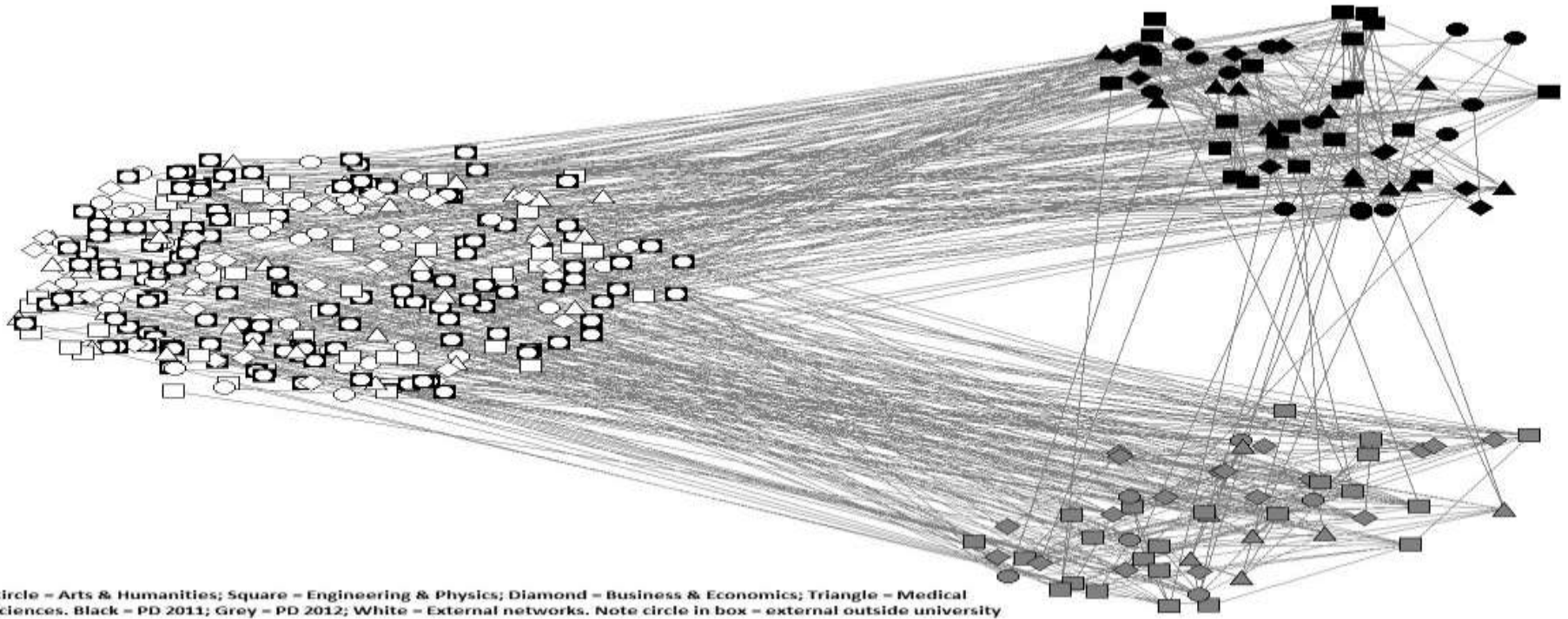
- As we only asked about students' network relations within the module, and not within other modules, or outside the classroom environment, we might have missed potential other network support structures of learners.
 - 20 participants indicated not to have learned from anyone in Figure 2.3 (and none of the 187 participants learned from these students), but perhaps these students had strong networks to discuss their practice outside the formal boundaries of the classroom (Akkerman & Bakker, 2011; Hommes et al., 2014).
- Many Confucian Asian students used Westernised names (e.g., Brenda) in class, while the list of names included only their official names (e.g., Wang).
- Many Confucian Asian names start with a C, W, X, Y, Z, which might negatively position this group (i.e., at the end of a SNA survey, when questionnaire fatigue might be an issue).

EXEMPLAR 3: OPEN SNA APPROACH WITH FOLLOW-UP IN-CLASS DISCUSSIONS



- In Exemplar 3, 114 academics from four faculties from a UK university participated in an 18 month Academic Development (AD) programme (Rienties & Hosein, 2015; Rienties & Kinchin, 2014)
- Nine months into this programme, we combined both a closed-network analysis approach with an open-network approach.
- In month 10 we presented the results in the form of three social network graphs (i.e., learning & friendship network of AD, external network) during a face-to-face session to 77 participants (in four separate rounds).
- Participants were asked to reflect individually on the social network graphs for 10 minutes using predefined questions. Then, participants worked in pairs and were asked to discuss their own reflections and compare notes for five minutes. Finally, a 15-20 minute general discussion was facilitated.

EXEMPLAR 3: OPEN SNA APPROACH WITH FOLLOW-UP IN-CLASS DISCUSSIONS



The results indicated that most academics developed cohesive links, either within their own assigned group or within the wider AD programme. As illustrated in Figure 2.3, in terms of informal learning outside the formal AD programme, academics on average maintained three ties, whereby most of these external ties were with disciplinary colleagues. In addition, most participants had at least one person with whom they discussed their learning and teaching practice outside their own institution.

EXEMPLAR 3: OPEN SNA APPROACH WITH FOLLOW-UP IN-CLASS DISCUSSIONS



- From the open-coding of the qualitative data, three broad thematic areas of professional, emotional and academic support were identified. Participants needed to find an outlet to share their feelings, in particular their challenges, anxieties and frustrations about their teaching, and their experiences on the AD programme in particular using these ties ([Rienties & Hosein, 2015](#); [Rienties & Kinchin, 2014](#)).

Limitations



- What could I have done differently?

Limitations



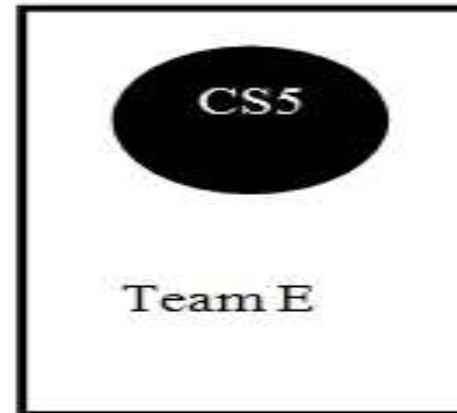
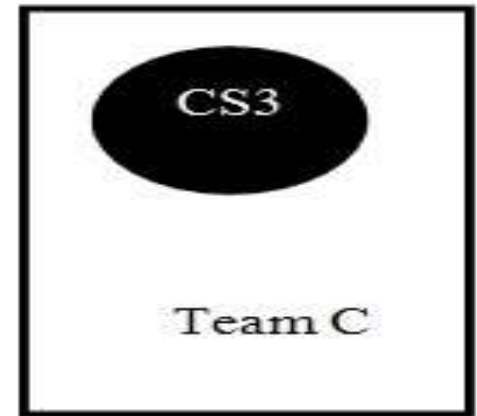
- The move from closed to open networks had definitely revealed new and important insights into how people learned inside and outside their academic development programme.
- Furthermore, the reflections in class one month after the SNA measurement were very useful to gain both individual, sub-group, and as a whole class perspectives on the potential underlying reasons why and how participants networked in and outside this AD programme.
- However, the open network approach quickly became unwieldy and difficult to codify (e.g., participants indicated “my wife”, “my colleagues in my department”, “John”), whereby I had to make inferences in terms of whether for example John from respondent 22 was the same as respondent 38, and how many colleagues were actually in a department.
- In this context participants were keen to learn from this exercise given that we had been working closely with these participants for nine months, and as post-docs/lecturers these participants were also researchers and (to a certain degree) interested in the findings. Whether this approach would work with younger participants, or with participants with whom limited rapport has been developed will need to be explored.

EXEMPLAR 4 CLOSED SNA WITH CASE-STUDIES



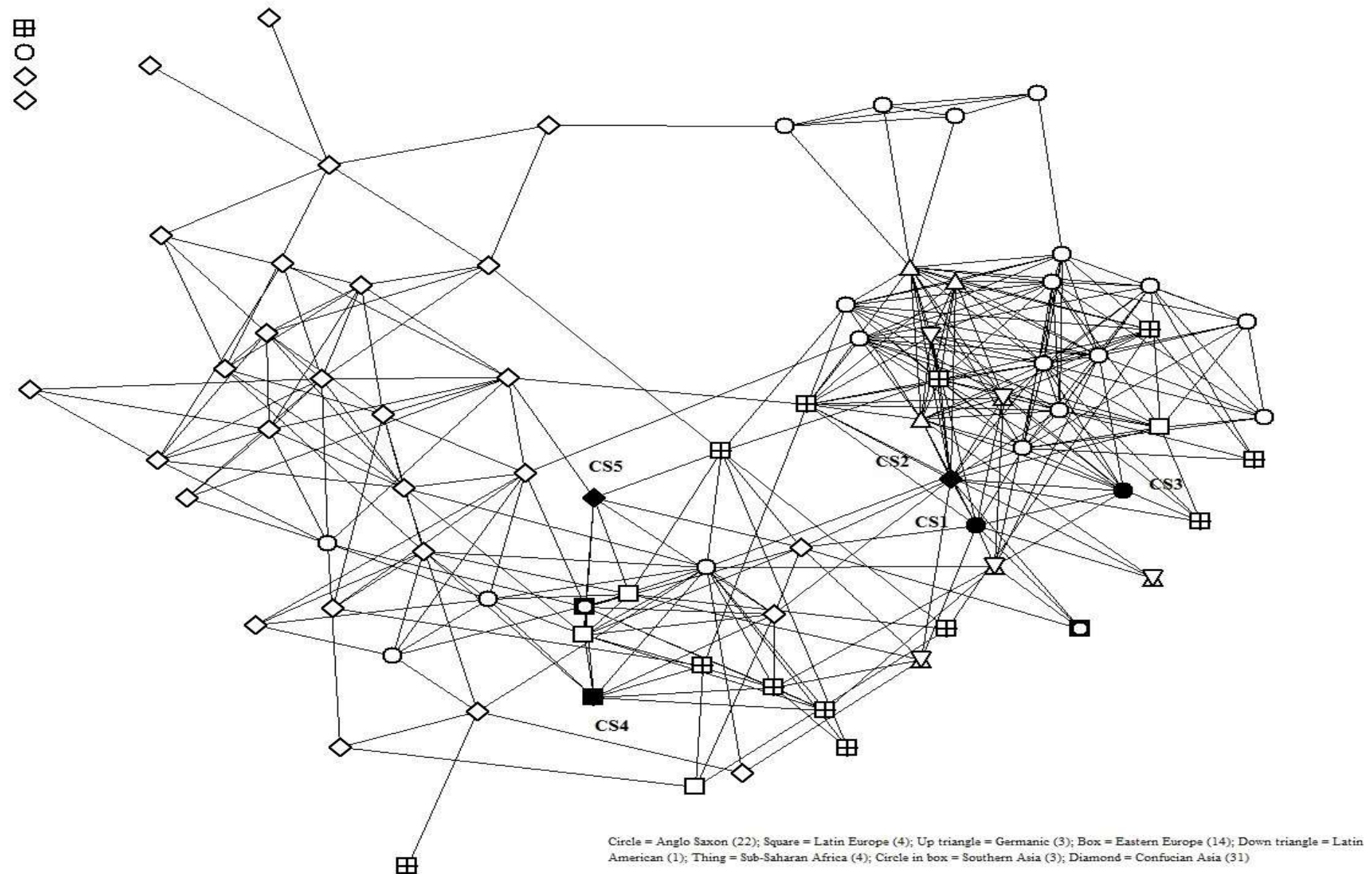
- Exemplar 4 undergraduate module with 81 students at a UK university in 2013 (Rienties et al., 2015). Like Exemplar 2, first we used a closed network approach of pre-test at Day 1 and post-test after 11 weeks.
- Second, we used an embedded case study (Yin, 2009) whereby we selected five potential cross-cultural bridge builders based upon their relative position at the pre-test, and we interviewed these five students one month after the post-test.
- We developed a thematic analysis around eleven key themes that reflected the meanings attributed to internationalisation (Hendrickson et al., 2011; Jindal-Snape & Rienties, 2016) and social network literature (Borgatti et al., 2009; Moolenaar, 2012; Rienties, Héliot, et al., 2013).

Triangulation of quants and quals

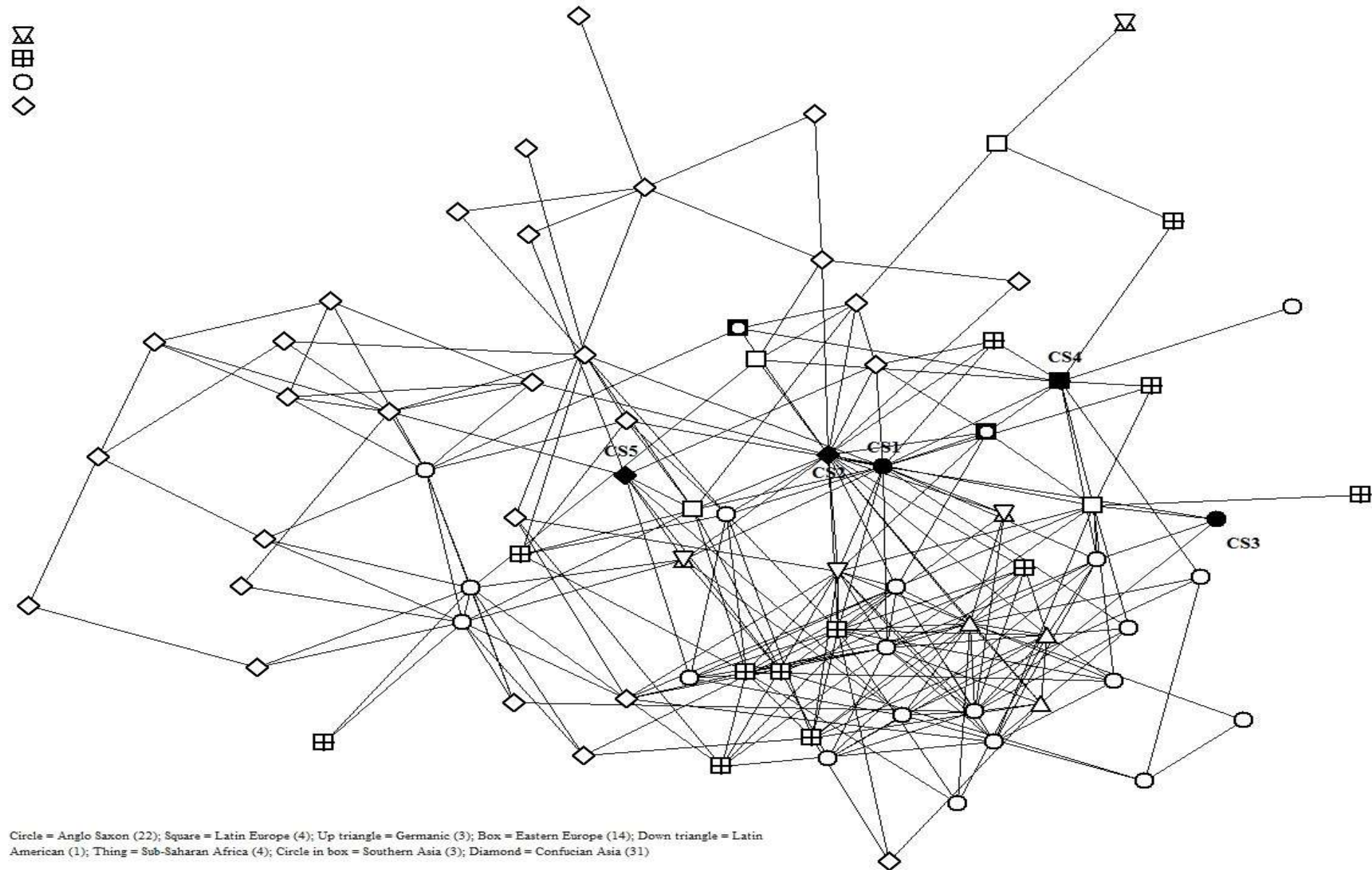


Module X

Learning network after 2 1/2 years

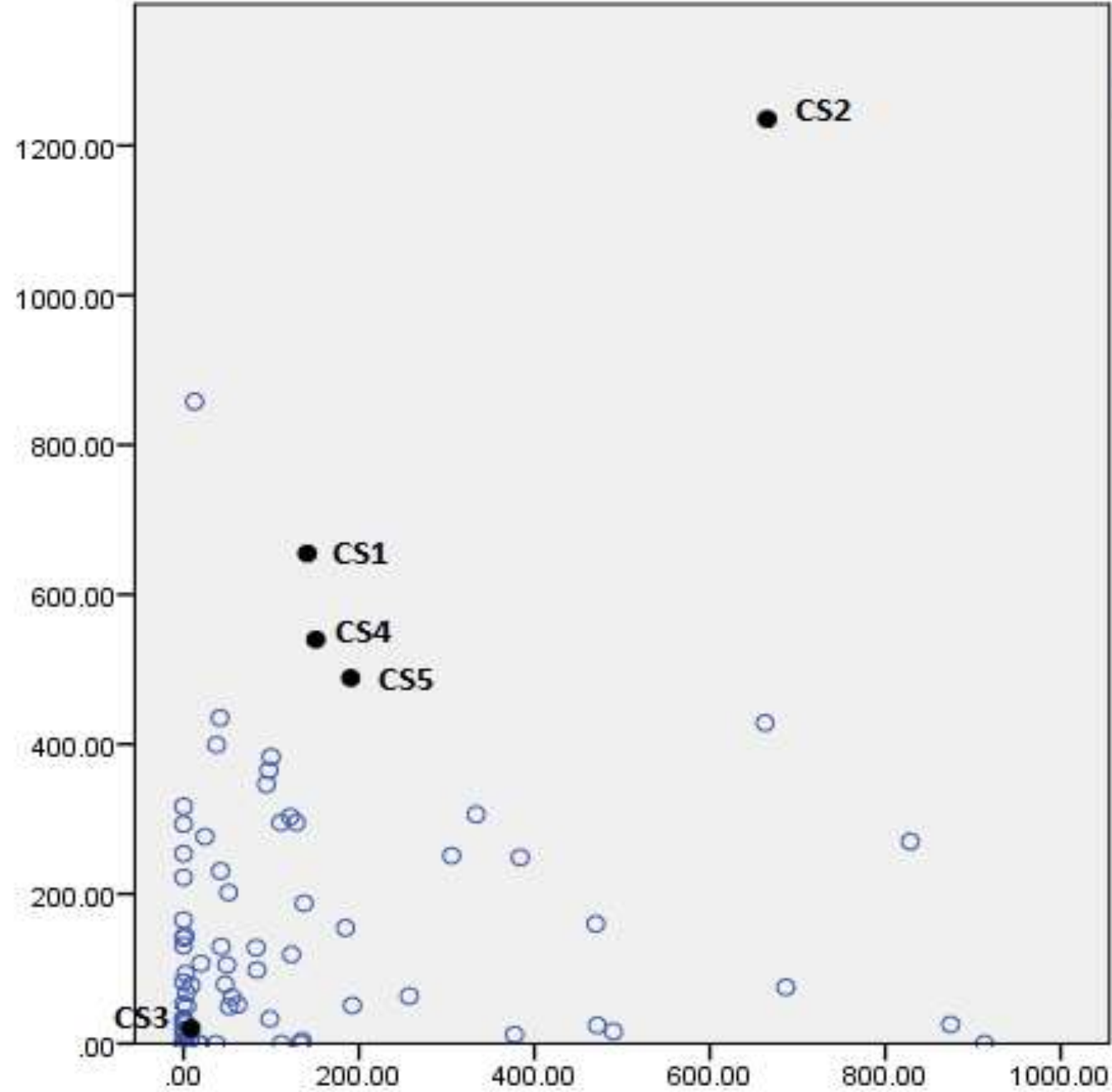


Learning network after 3 years



Circle = Anglo Saxon (22); Square = Latin Europe (4); Up triangle = Germanic (3); Box = Eastern Europe (14); Down triangle = Latin American (1); Thing = Sub-Saharan Africa (4); Circle in box = Southern Asia (3); Diamond = Confucian Asia (31)

Betweenness in learning network (post-test)



Interview

- Other students
- Case study

Betweenness in learning network (pre-test)

Table 1 Descriptive SNA statistics of five case study participants vs. others.

	At day 1 (pre-test)							After eleven weeks (post-test)						
	# Ties	Same culture	Different culture	OutDeg	Indegree	Betweenness	E-I Index	# Ties	Same culture	Different culture	OutDeg	Indegree	Betweenness	E-I Index
CS1 Jennifer	12	2	10	10	6	141.10	0.67	18	5	13	16	14	654.89	0.44
CS2 Misaki	17	2	15	11	12	665.30	0.77	22	5	17	16	17	1235.31	0.55
CS3 Fatima	10	4	6	9	3	8.46	0.20	4	3	1	4	4	20.47	-0.50
CS4 Magdalena	9	3	6	7	6	150.88	0.33	11	3	8	8	9	539.79	0.46
CS5 Eyah	7	3	4	7	1	190.58	0.14	8	3	5	7	4	488.40	0.25
Mean others	7.81	3.45	4.36	4.93	5.27	128.53	0.02	5.93	1.99	3.95	4.71	4.75	132.08	0.20
SD others	4.84	3.05	4.25	3.65	4.43	216.80	0.66	4.14	1.93	3.83	3.60	3.64	151.70	0.68
F-value	2.076	0.272	3.934*	5.305*	0.039	1.087	1.932	11.174**	4.365*	7.078**	10.425**	7.875**	31.295**	0.035

F-values (ANOVA), * $p < .05$, ** $p < .01$

Table 2.1 Characteristics list of bridge builders: summary of five case study participants

Characteristics	CS1	CS2	CS3	CS4	CS5
	Jennifer	Misaki	Fatima	Magdalena	Eyah
Cultural sensitivity	✓	✓	✓		
Motivation to do well	✓	✓	✓	✓	
Positive about sharing and learning from others	✓	✓	✓		✓
Positive about differences in practical and theoretical experience	✓				
Positive about different styles of learning	✓		✓		✓
Conscious strategies for conflict resolution	✓	✓	✓		
Leadership skills		✓			
Adaptability		✓			✓
Respecting other people's choices	✓	✓	✓	✓	
Good communication skills and willingness to communicate	✓	✓	✓		
Academically able	✓	✓	✓	✓	✓

Note that if response is not ticked, this does not imply that a student does not have this characteristic, but that during the interview this characteristic was not made explicit.

Source: [Rienties et al. \(2015\)](#)

In contrast to Jennifer and Misaki, the other three potential bridge builders became relatively more isolated from their assigned group and positioned more closely to peers with similar cultural backgrounds. For Fatima and Magdalena this move away from the centre was a conscious choice, while for Eyah the focus toward Confucian Asian students was a result of her extremely negative (perceived) experiences when working in a group with only UK students (Rienties et al., 2015).

Limitations



- What could I have done differently?

Limitations



- This was the first time we used an embedded case-study where we specifically sampled students based upon pre-determined conceptualisations of cross-cultural bridge builders.
- This provided profound and deep insights why some students indeed became cross-cultural bridge builders over time, while others did not.
- At the same time, by visualising the SNAs back to the five students this induced both positive and negative feelings of students.
- For Misaki it was a rewarding experience as she received confirmation of her wide cross-cultural network, and was pleased to see how well she was connected across the different cultural groups.
- In contrast, for Eyah the interview was rather traumatic, as she was clearly distressed by the negative experiences of her UK group members, who ignored her inputs into group discussions. This was further accentuated by seeing the SNA visualisations of a lack of reciprocity by her group members. Although the second interviewer and I received a warm email message after the interview, this was clearly a negative experience for this student.

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