Leveraging Expertise Differences in Work Teams

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Why we started this research…

• Dutch innovation platform: Taskforce consisting of a number of opinion leading in The Netherlands
• Goal: Find ways to increase the productivity of knowledge workers to stimulate the economy
• Suggestion: Bring together people from different expertise areas to work together and develop new ideas
• Stimulate the use of MD and CF work teams

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Basic assumption

• When individuals with different expertise areas cooperate and work together, they can produce exceptional outcomes that could not be achieved individually (see e.g., a symphony orchestra)
• Expertise dissimilarity will result in diverse perspectives and creativity, and will therefore help to solve complex problems & create new products

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Findings from diversity research

- Mixed findings because people may categorize others into in-groups and out-groups based on a number of characteristics, including those related to expertise (for a review of diversity research, see Williams & O'Reilly, 1998).
- Categorization results in biased perception and stereotyping of dissimilar others, decreased attraction, identification, and helping.

The Problem of Expertise Differences

Central research question

Which factors enhance the positive and dampen the negative effects of intrateam expertise dissimilarity on cooperativeness, team member learning, and team effectiveness (e.g., team design features, team member motivational factors)?
Team design: Interdependence

- Social interdependence theory: Structural relations between team members determine pro-social behavior (Lewin, 1948; Johnson & Johnson, 1989; Wageman, 1995).
- Two dimensions:
  - Task interdependence (task inputs):
    - Low: telephone installer
    - High: surgeon
  - Goal interdependence (task outputs):
    - Low: individual goals, feedback, and/or rewards
    - High: group goals, feedback, and/or rewards

Study 1:
The effects of task interdependence

- Task interdependence may vary within and between teams
  - e.g., anaesthetist in a surgical team
- Task interdependence may vary over time
  - Info. exchange among various functions in product development team changes over time
- Task interdependence - helping (+)
  - Felt responsibility, recognition of need for help, ability to punish or reward others

Research Model

- Perceived expertise dissimilarity
- Helping behavior
- Team performance
- Task interdependence

Categorization theory
Interdependence theory
Knowledge and skill sharing stimulates individual learning.
Theory

Research into the contact hypothesis & the intergroup relations literature suggest:

– Task interdependence low
  KSA dissimilarity - helping (+) due to categorization effects (similar to situation in minimal group paradigm)
– Task interdependence high
  Individuated rather than stereotypic perception of others; reduction of anxiety; categorization effects dampened; recognition of complementary roles and KSA; Expertise dissimilarity - helping (+)

Method (1)

• Two-wave panel study during business simulation
• Top management team decision making (about 30 strategy issues)
• T1 after 1 week (N=124, 20 teams), T2 after 2 weeks (N=87, 19 teams);
• Feedback about quality of decisions relative to other teams: high goal interdependence

Method (2)

• Task interdependence (5 items)
  – e.g., I have to work closely with the other team members to do my work properly
• Perceived expertise dissimilarity (3 items)
  – e.g., I have other skills than the other team members
• Team performance
  – Composite measure of market share, profit, and projected sustainability
• Peer-rated helping behavior (1 item)
Method (3)

Round Robin design:
Every team member rates and is rated by all the other team members.

Results (1)
• No differences between respondents on T1 and T2
• High reliabilities and factor loadings (CFA)
• Factor invariance
• Intra-class correlations nonsignificant
  – HRA instead of HLM
  – substantial within- and between-team differences in dissimilarity, TI, and helping

Results (2)
• Perceived expertise dissimilarity unrelated to helping behavior
• Task interdependence positively related to helping behavior at T2 (even after controlling for helping at T1)
• Significant team-level correlations between helping and team performance at T1 and T2
What Next?
- Effects of objective expertise dissimilarity (educational background/level, job type)
- Moderating effects of task and goal interdependence
- Mediating variables (e.g. team identification)

Study 2:
The role of task and goal interdependence

![Diagram showing the relationship between task interdependence, objective expertise dissimilarity, goal interdependence, team identification, and helping.]

Results (3)

![Graph showing the relationship between expertise dissimilarity and helping, with different lines for TI Low and TI High.]

Theory
Relationship between expertise dissimilarity and identification depends on TI and GI
TI and GI congruent (LL/HH): uncertainty low, no categorization (Hornsey & Hogg, 2003) > no negative effect on identification
TI and GI incongruent (HL/LH): much uncertainty, much categorization (Hornsey & Hogg, 2003) > negative effect on identification

Method (1)
• 20 project teams, Telecom company (N=129)
• Electronic surveys
• Respondents sent coded answers back via email
• Existing scales to measure TI, GI, team identification, and helping (self-reports)
• Results of reliability analyses and CFAs were OK
• No statistical dependence in the data > HRA

Method (2)
Determining expertise dissimilarity (educational background, level, and job type) using Euclidian distance measure (Tsui et al.; percentage of people in team with another background than you)
Results (1)

- Expertise dissimilarity effects were identical for dissimilarity in ed. level, ed. background, and job type.

Results (2)

- Similar interaction effects for helping
- Team identification fully mediated the effect of expertise dissimilarity on helping

Conclusion

- Similar effects for objective expertise dissimilarity as in Study 1
- Moderating effects of task and goal interdependence
- Effects mediated by team identification
- Generalizability of findings from controlled setting to field setting
What next?

- Team-level effects?
- Team learning and effectiveness?
- How about team members’ motivation to exchange perspectives?

Study 3:
The role of collective team identification

Theory

- So far: Team identification as a mediator
- But: Relationship between expertise dissimilarity and identification far from perfect
- Therefore: Now collective team identification (CTI) as a moderator
- Reason: CTI reflects a superordinate identity that dampens categorization effects (Hornsey & Hogg, 2003)
Sample and Data

- Sample
  - 57 multi-disciplinary teams from a multi-national corporation in the oil and gas industry (scientists, engineers, technicians)
  - Average team size = 11 members
  - 84% male, Average age = 42.7 years

- Data Collection
  - Team supervisors completed a supervisor survey and asked 4 member “informants” to complete a member survey
  - Demographic data were obtained from personnel records

Measures*

- Expertise diversity
  - Blau heterogeneity index across specialization areas

- Collective team identification
  - Four items from Bergami and Bagozzi (2001), alpha = .92

- Team learning behavior
  - Four items from Edmondson (1999), alpha = .75

- Team effectiveness (supervisor ratings)
  - Three items from Ancona & Caldwell (1992), alpha = .87

- Controls:
  - team size, diversity in tenure, age, gender, & nationality

* CFA and inter-rater agreement measures were all strong.

Expectations

- Simple two-way interaction between expertise diversity and CTI for team performance…
- …mediated by team learning

But this is what we found…
Conclusions

- Teams are better able to leverage diverse expertise when members identify with the team.
- When collective team identification is high we see increasing returns to greater expertise diversity ...
  - but only up to a point because the complexity of integrating highly diverse domains of knowledge and expertise becomes prohibitive.
- When collective team identification is low we see decreasing returns to greater expertise diversity ...
  - but only up to a point because at very high levels of diversity social categories no longer define subgroups.
- Expertise diversity promotes effectiveness in part by motivating the process of learning.
Study 4: Expertise differences in teams

- So far most research on expertise differences in teams has focused on domain differences
  > Equivoval effects on processes and outcomes (Milliken & Martins, 1998; Williams & O’Reilly, 1998)
- Much less is known about expertise level differences (especially the relationship with group process variables)
  > Higher overall competence is better (Barick et al., 1998)
- Common aspiration: Higher-competence members help lower-competence members

Theoretical Model

- B's perceived expertness (T1)
- A's perceived expertness (T1)
- B's commitment to A (T2)
- A's commitment to B (T2)
- B's helping of A (T3)
- A's helping of B (T3)
- Group performance (T3)

Low expertness of A mitigates the positive effect of B's expertness on A's commitment to B; A is more vulnerable to indifference or exploitation.

Method (1)

- 24 four-person student work groups (N=96), working on a research project (10-12 months)
- Task: define a research problem, search for relevant literature, develop hypotheses, conduct a study, analyze data, and report results in the form of an article
- Data collected after 3, 6, and 9 months
- Round-robin design
- Data about 278 out of 288 possible relationships.
- 68% female, Average age = 22.7 years
Method (2)

- Perceived expertness of X (T1 and T3)
  - E.g., creative ability, social skills, leadership skills
- Commitment to X, 4 items (T2)
  - E.g., “I feel very committed to X” (Van der Vegt, Van de Vliert & Oosterhof, 2003)
- Interpersonal helping of X, 5 items (T3)
  - E.g., “I help X when s/he is running behind” (Settoon & Mossholder, 2002)
- Team supervisors rated team performance, 6 items (T3)
  - E.g., quality of work, meeting deadlines

Method (3)

- (test-retest) reliabilities, CFAs, and $r_{wq}$ were all strong
- An HLM application of the Social Relations Model (Snijders & Kenny, 1999), which explicitly takes statistical dependence in the data into account
- In all analyses we control for age, gender, age dissimilarity, gender dissimilarity, and expertise domain dissimilarity (=$\text{Sum of absolute differences across all 6 competencies}$)
- IVs: Expertise level A, expertise level B, and their interaction

Results (1)

- Main effect of B’s expertise level for commitment and helping (b’s of .38*** and .07*)
- Significant interaction effects for commitment and helping (b’s of .30*** and .07*)
Results (2)

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Results (3)

• Significant dyadic reciprocation for both commitment and helping (e.g., I help you if you help me).
• Commitment fully mediated main and interactive effects of perceived expertise level of A and B on helping.
• Who is helping whom?
  ➢ IV: team-level $r \{\text{perc. exp. A} - \text{perc. exp. B}\}$ with helping.
  ➢ “who is helping whom” measure is positively related to team performance ($b=.51$, $p<.05$, $\Delta R^2=.20$).

Conclusion

• Strong support for research model
• Apart from domain differences: effects of expertise level differences.
• Overall, low-expert team members tend to identify with and help high-expert team members more than vice versa (“everybody is feeding the star”).
• BUT some dyadic reciprocation!
• In teams in which high-expert members help low-expert members (learning) performance is higher.
• Important question: Which factors stimulate the helping of low-expertise members? Preliminary findings show that individual and group feedback play an important moderating role (de Jong, van der Vegt, and Molleman, submitted)
Overall conclusion

• Four studies showed that expertise differences in teams may indeed be beneficial but the effects are more complex than anticipated
• Interaction effects at the relational, individual and team levels of analysis showed that the effects of expertise differences on identification, helping, learning, and team effectiveness depend on the interdependence configuration as well as on motivational factors
• Differences in expertise domains as well as in expertise level affect group processes and effectiveness

Directions for future research

• Integrative model explaining the effects of expertise domain and level (Van der Vegt & Bunderson)
• Mental representations of expertise differences in teams as cognitive mediating mechanism (Timmerman, Van der Vegt, Molleman & Bunderson)
• Exploring connections with the transactive memory literature; knowing who knows what (Grutternk, Van der Vegt, Molleman, & Jehn)