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Issues in Organisation and Management of Multidisciplinary Group Design Projects

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ISSUES IN ORGANISATION AND MANAGEMENT OF MULTIDISCIPLINARY GROUP DESIGN PROJECTS

Ken Keating, Claire Brougham, Graham Gavin, Ger Reilly

SCHOOL OF MANUFACTURING AND DESIGN ENGINEERING

DUBLIN INSTITUTE OF TECHNOLOGY, IRELAND

The BSc in Medical Device Innovation

Dublin Institute of Technology

Different to a typical undergraduate programme.

- Varied age, experience, and demographic profiles

Provides up-skilling for the unemployed from various educational backgrounds

- Design, science and engineering

The traditional working boundaries involve

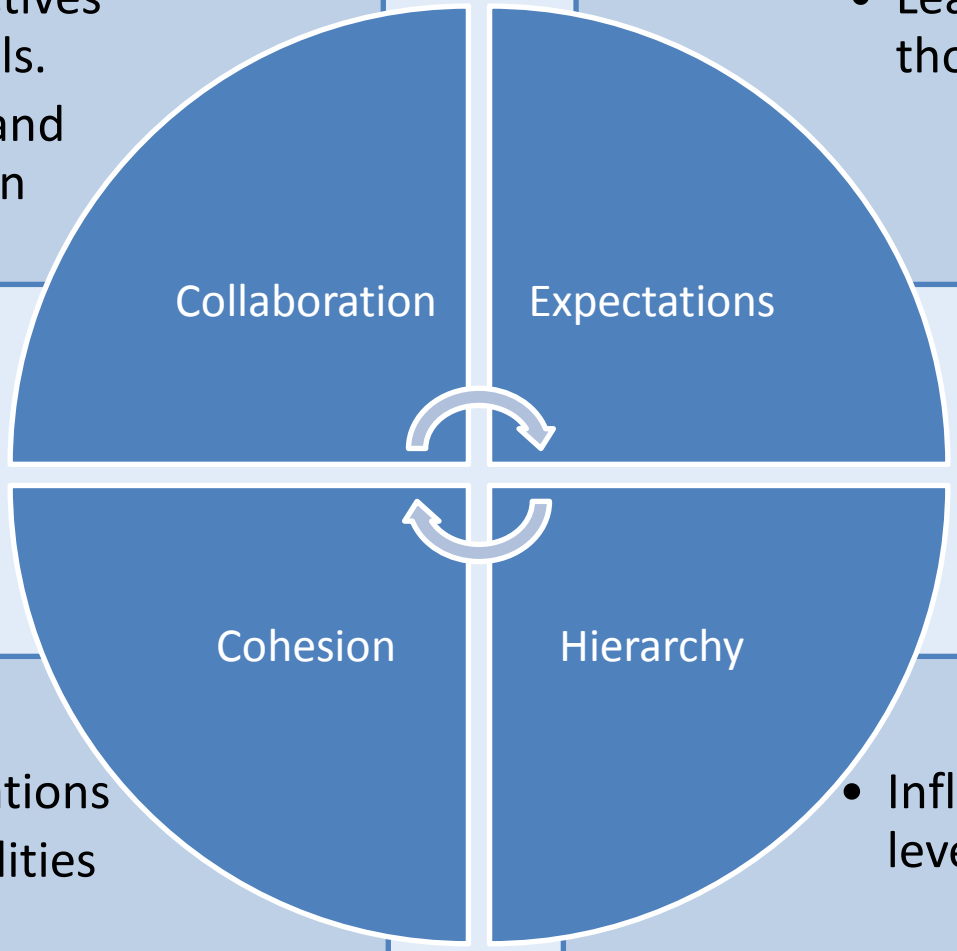
- Engineers, designers, scientists, medical professionals and business professionals

Multidisciplinary Groups in Biomedical Device Design Industry

- Crossover between science, design and engineering
- May be geographically disparate from each other and may initiate, exist, evolve and devolve over the life of A project.
- Exchange and interaction of knowledge within the team is a central component of effective team working

- Different perspectives and specialist skills.
- Communication and management is an essential

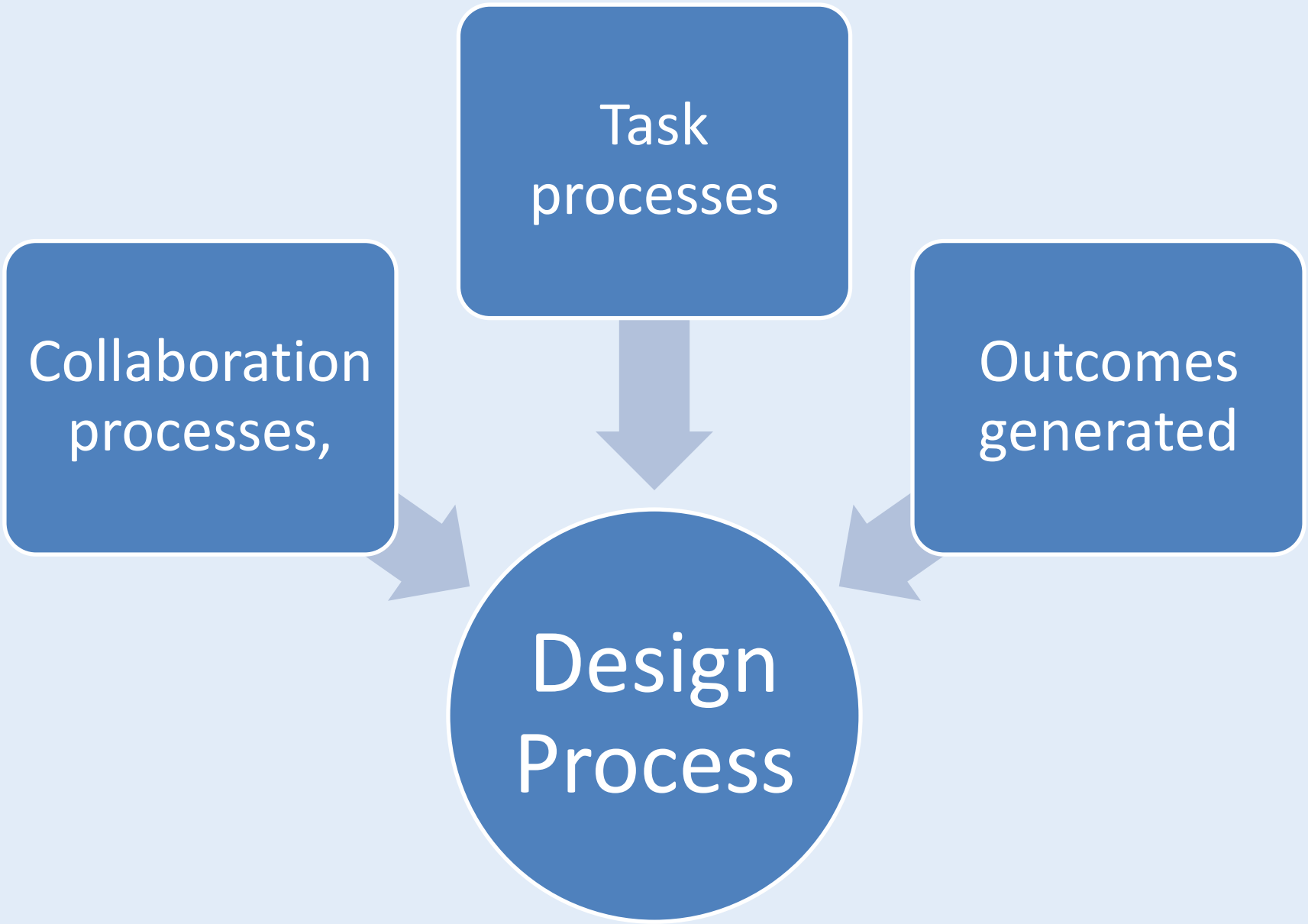
- Lead to different thoughts and actions

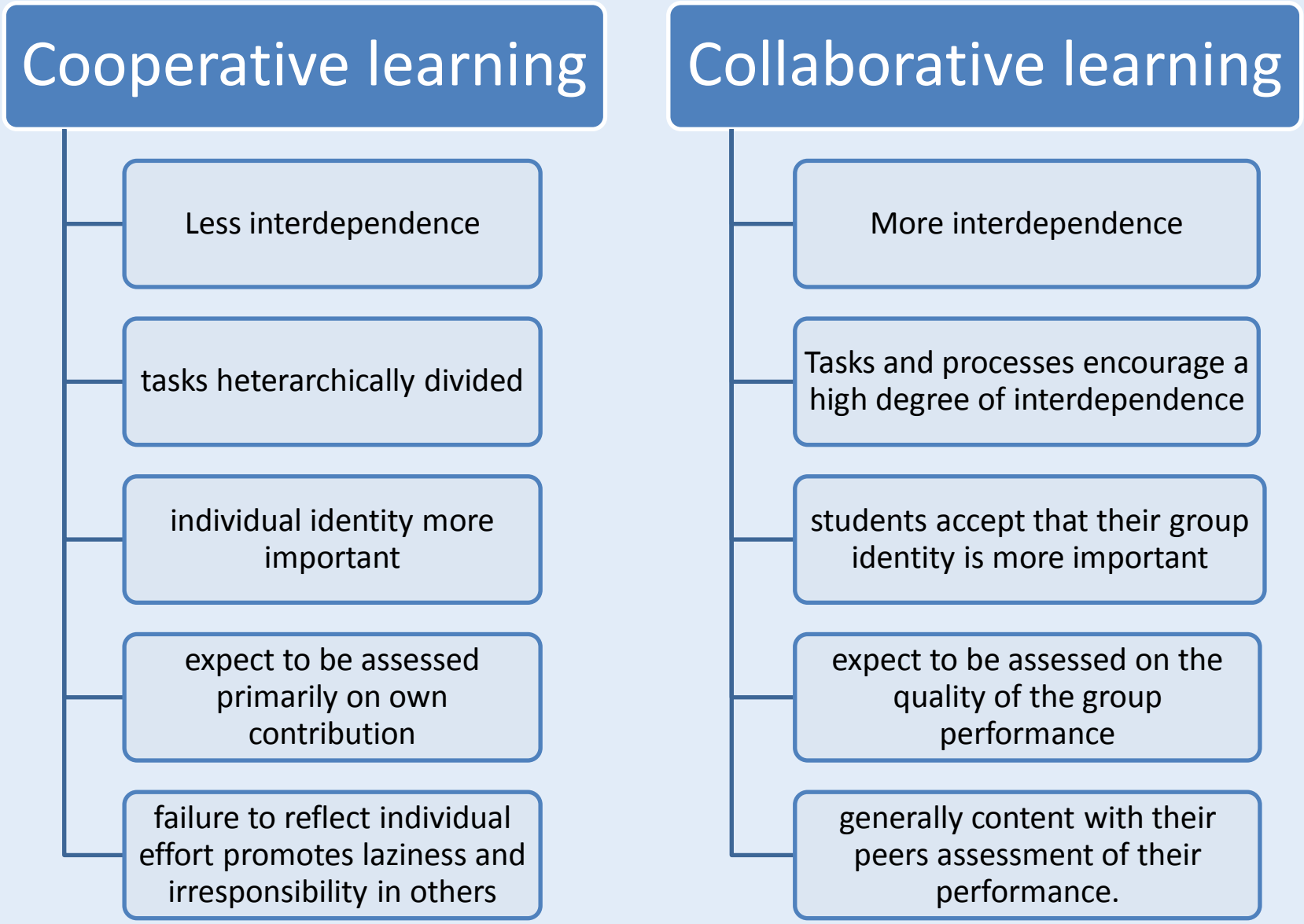


- Individual Motivations
- Clashing personalities and egos

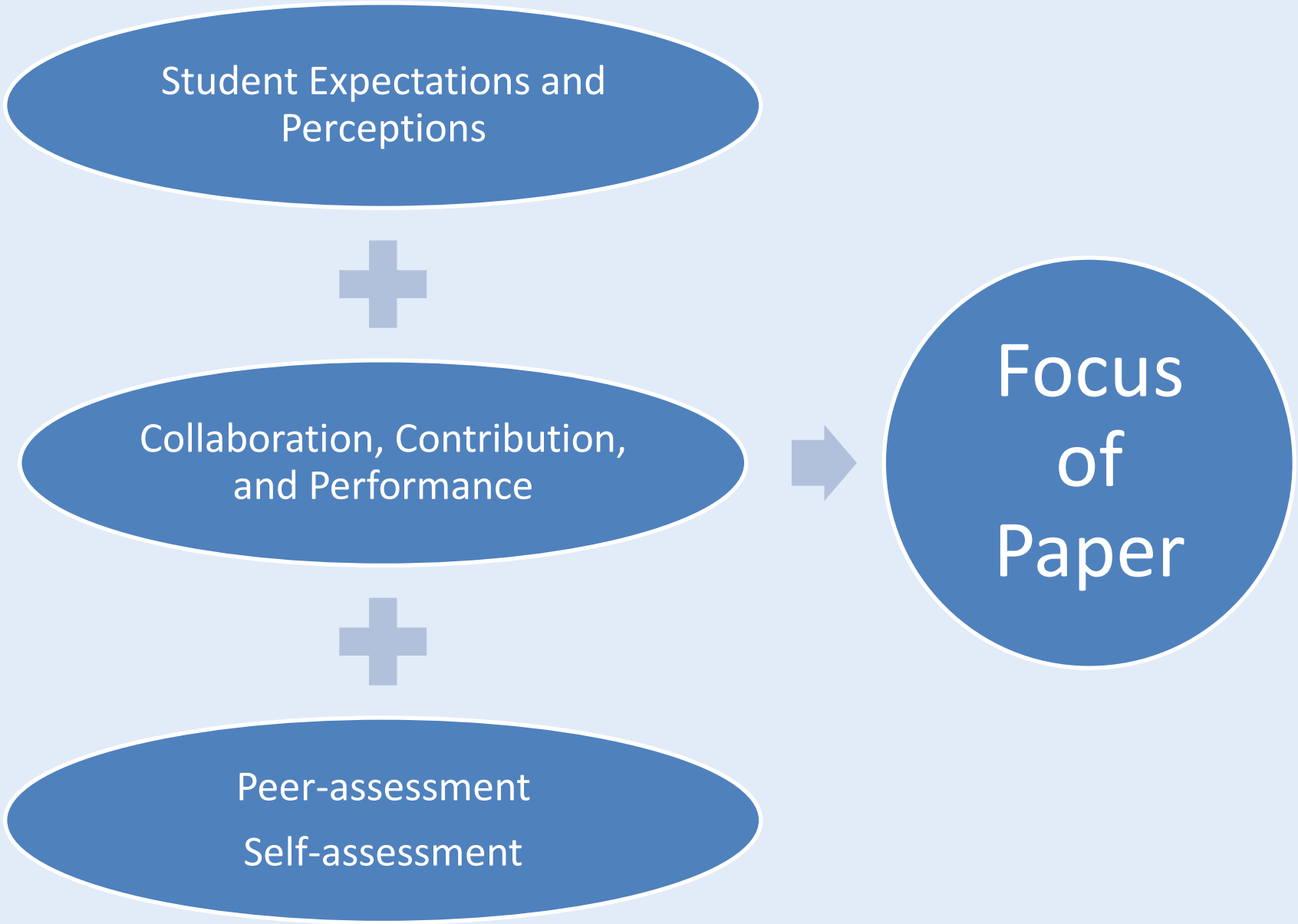
- Influences a person's level of collaboration

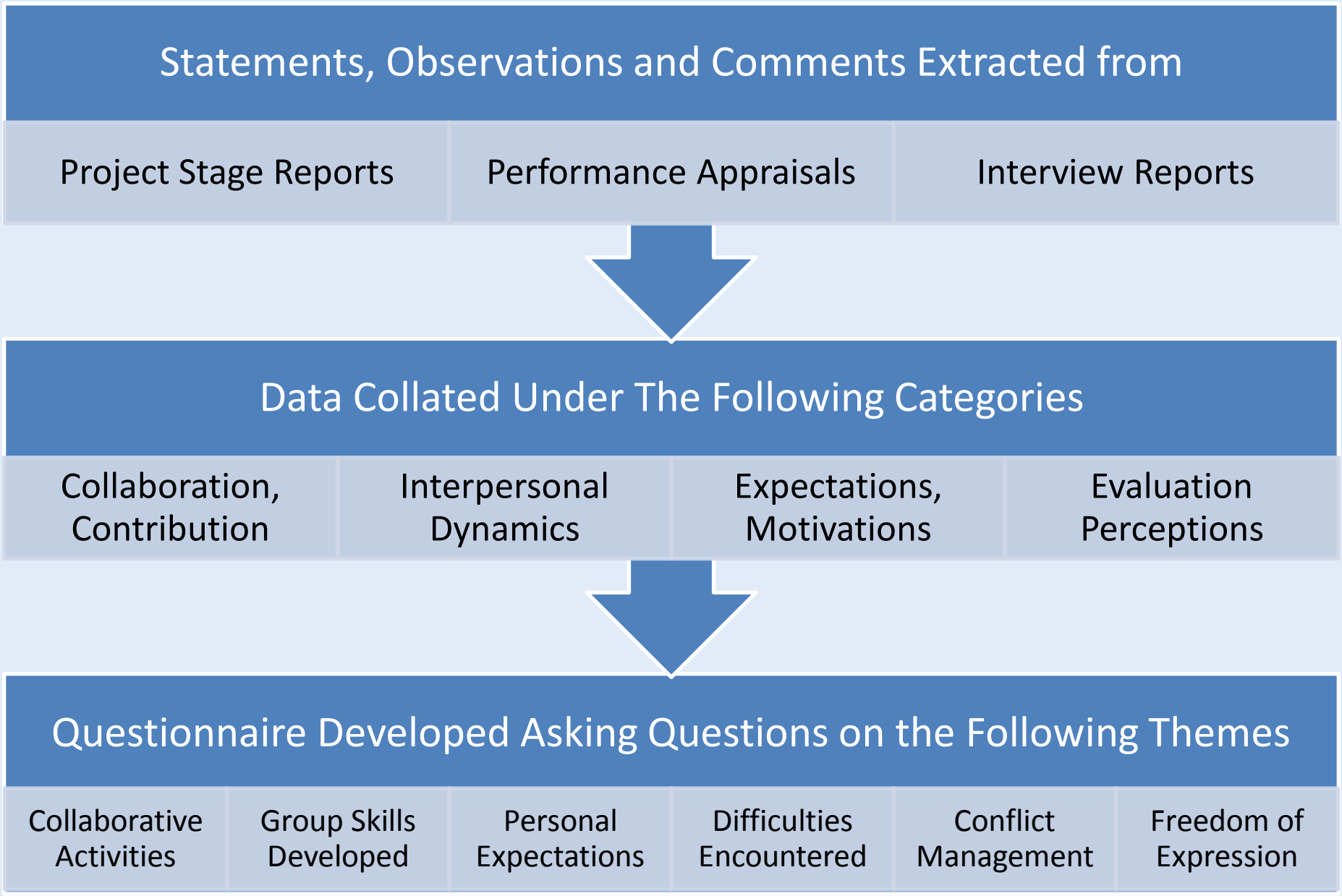
Détienne F., Baker M., and Burkhardt J.-M. Perspectives on quality of collaboration in design, *CoDesign: International Journal of CoCreation in Design and the Arts*, 2012, 8(4), pp. 197-199.
Feast L. Professional perspectives on collaborative design work, *CoDesign: International Journal of CoCreation in Design and the Arts*, 2012, 8(4), pp. 215-230.

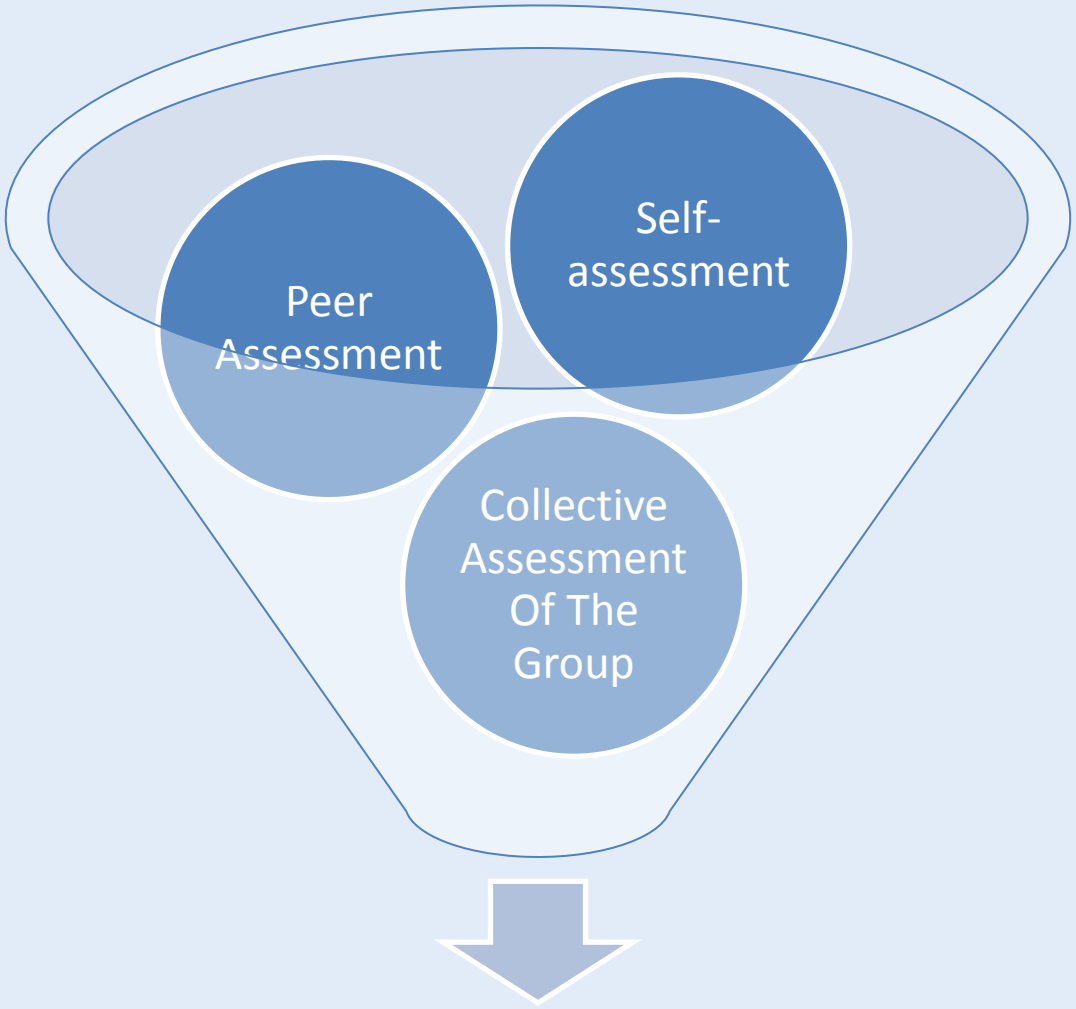

Task processes
Collaboration processes,
Outcomes generated
Design Process



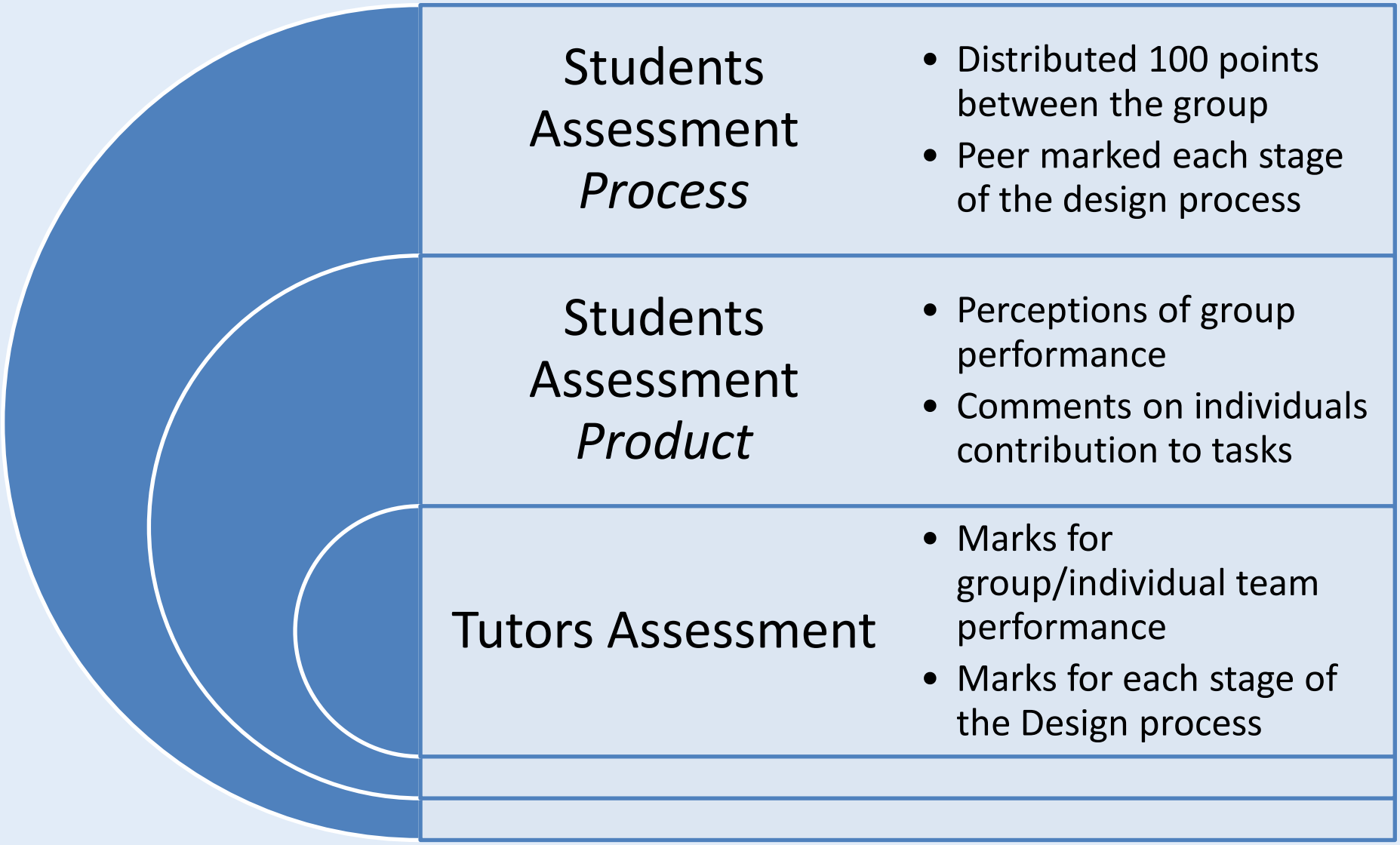
Curşeu P. L., and Pluut H. Student groups as learning entities: The effect of group diversity and teamwork quality on groups' cognitive complexity, *Studies in Higher Education*, 2011, 38(1), pp. 87-103.


Student Expectations and Perceptions
Collaboration, Contribution, and Performance
Peer-assessment
Self-assessment
Focus of Paper


Statements, Observations and Comments Extracted from
Project Stage Reports
Performance Appraisals
Interview Reports
Data Collated Under The Following Categories
Collaboration, Contribution
Interpersonal Dynamics
Expectations, Motivations
Evaluation Perceptions
Questionnaire Developed Asking Questions on the Following Themes
Collaborative Activities
Group Skills Developed
Personal Expectations
Difficulties Encountered
Conflict Management
Freedom of Expression



Qualitative Comments and Quantitative Evaluation of Contribution and Performance


Students Assessment *Process*
• Distributed 100 points between the group
• Peer marked each stage of the design process
Students Assessment *Product*
• Perceptions of group performance
• Comments on individuals contribution to tasks
Tutors Assessment
• Marks for group/individual team performance
• Marks for each stage of the Design process

Data Apportioned to the Following Categories

- Expectation
- Perception of performance
- Perceived contribution
- Assessment

THEY EXPECTED	THEY DID NOT EXPECT
• *work to be allocated equally* • *hard working groups people attending meetings, handing work in on time* • *members to be polite, show respect to one another* • *everyone to work away on their own tasks* • *groups to be well organised and efficient* • *everyone sharing the same goals and standards* • *better communications, agreed leadership* • *everyone would have a similar level of interest*	• *collaboration to be so much hard work* • *lazy people doing very little work* • *conflict* • *everyone having a different perspective* • *so much time wasting* • *everyone needed to be treated differently and let be themselves*

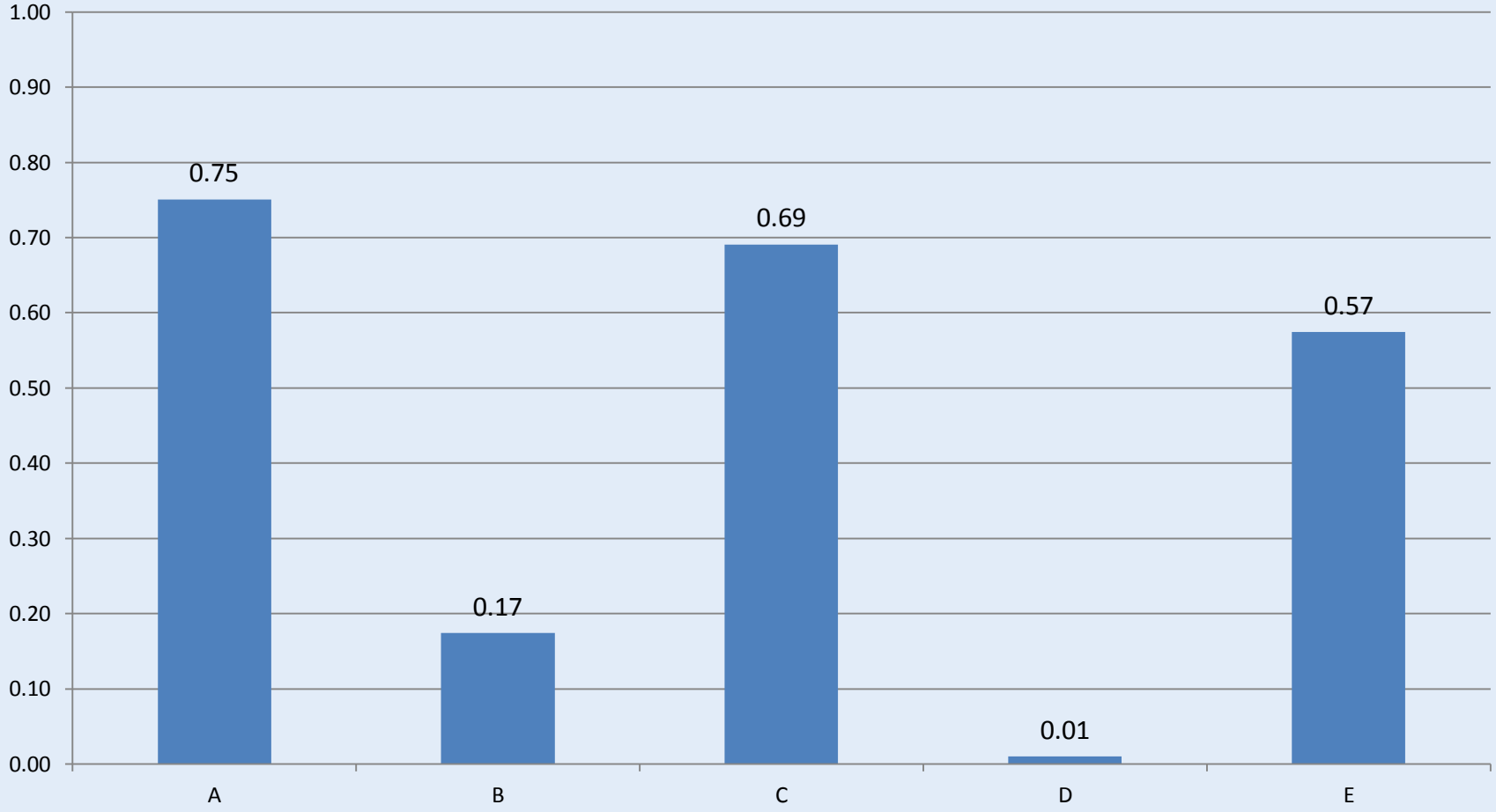
Interpersonal Differences
moving forward a problem
delusional
acting as if its their project
difficulty
lack of contribution
confusion
personalities clashed
not willing to listen
no work was done
conflict
could not be led
difficult

Groups that fell into this category had a poor correlation between the individual self-assessment of their performance and their performance as assessed by their peers in the group

Leadership inadequacies became significant barriers to successful collaboration in setting and achieving group targets

Poorly managed groups had difficulty performing and poor communication appeared to be the most serious impediment to good group management.

Correlation between Group and Individual Perception of Performance



Large Impact

- experience, particularly experience in relevant technical skills

No Impact.

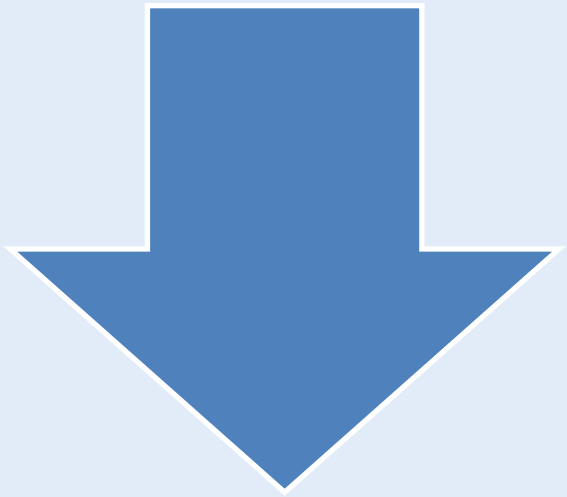
- Gender, age, and culture
- Group Size (3-5)

Issues arising

- leadership,
- cliques,
- exclusion
- perceived position in the group hierarchy

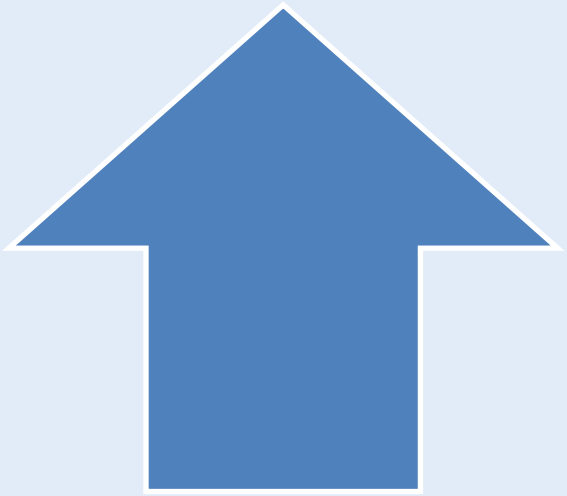
Group Members Recognised The Absence Of Leadership

Confused Control with Leadership

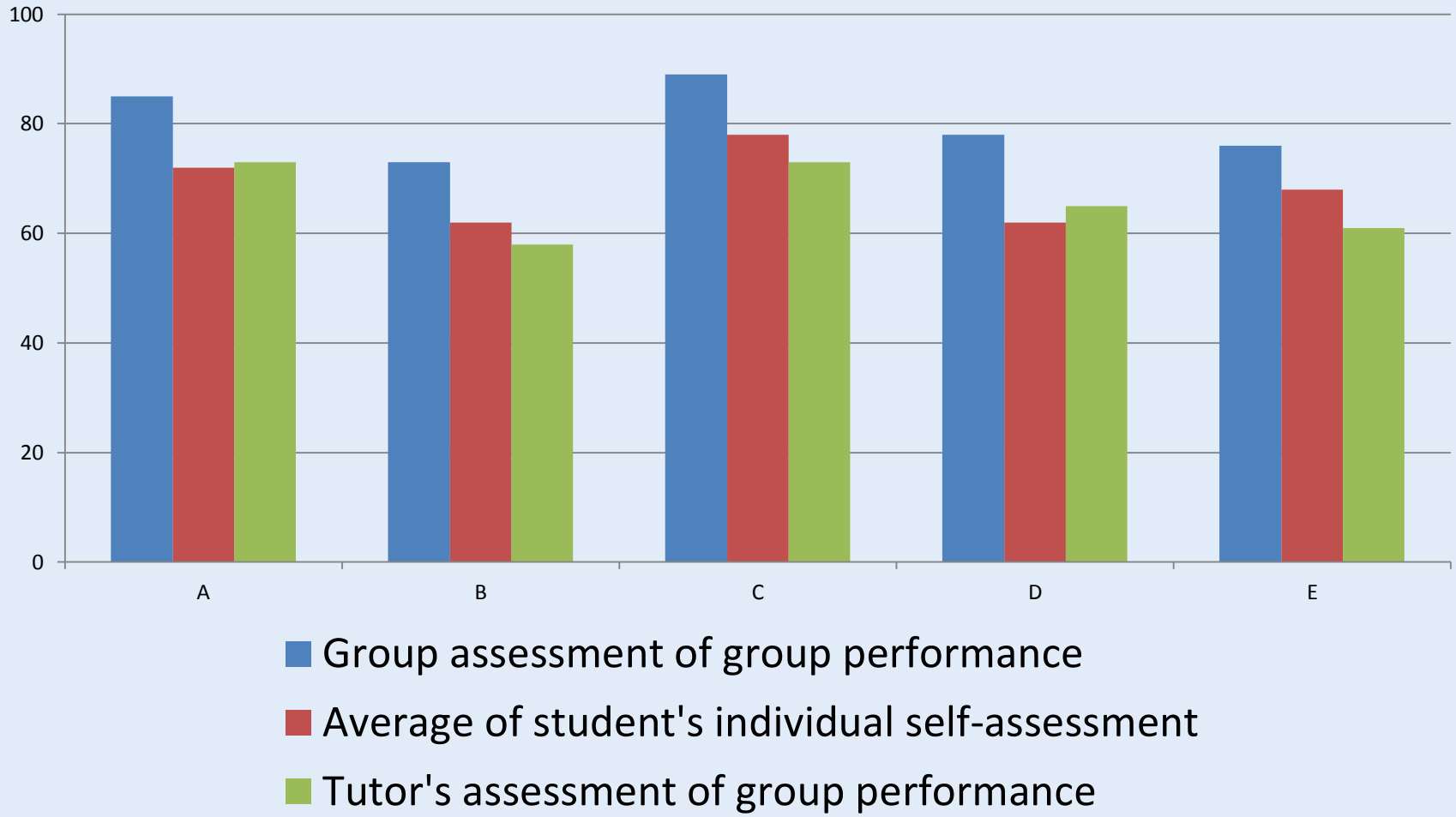


Group's Collective Self-assessment

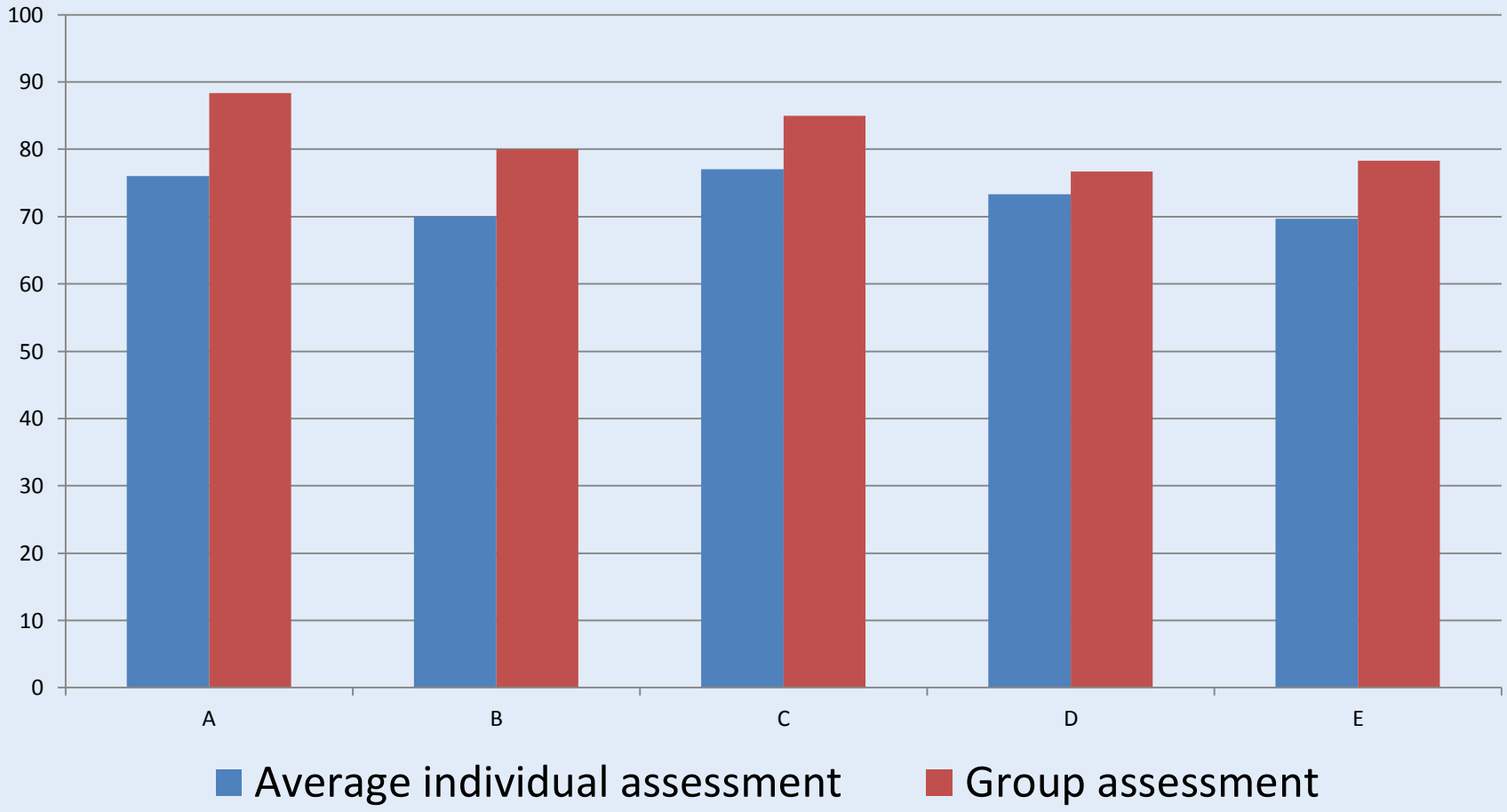
Average of Student's Individual Self-assessment



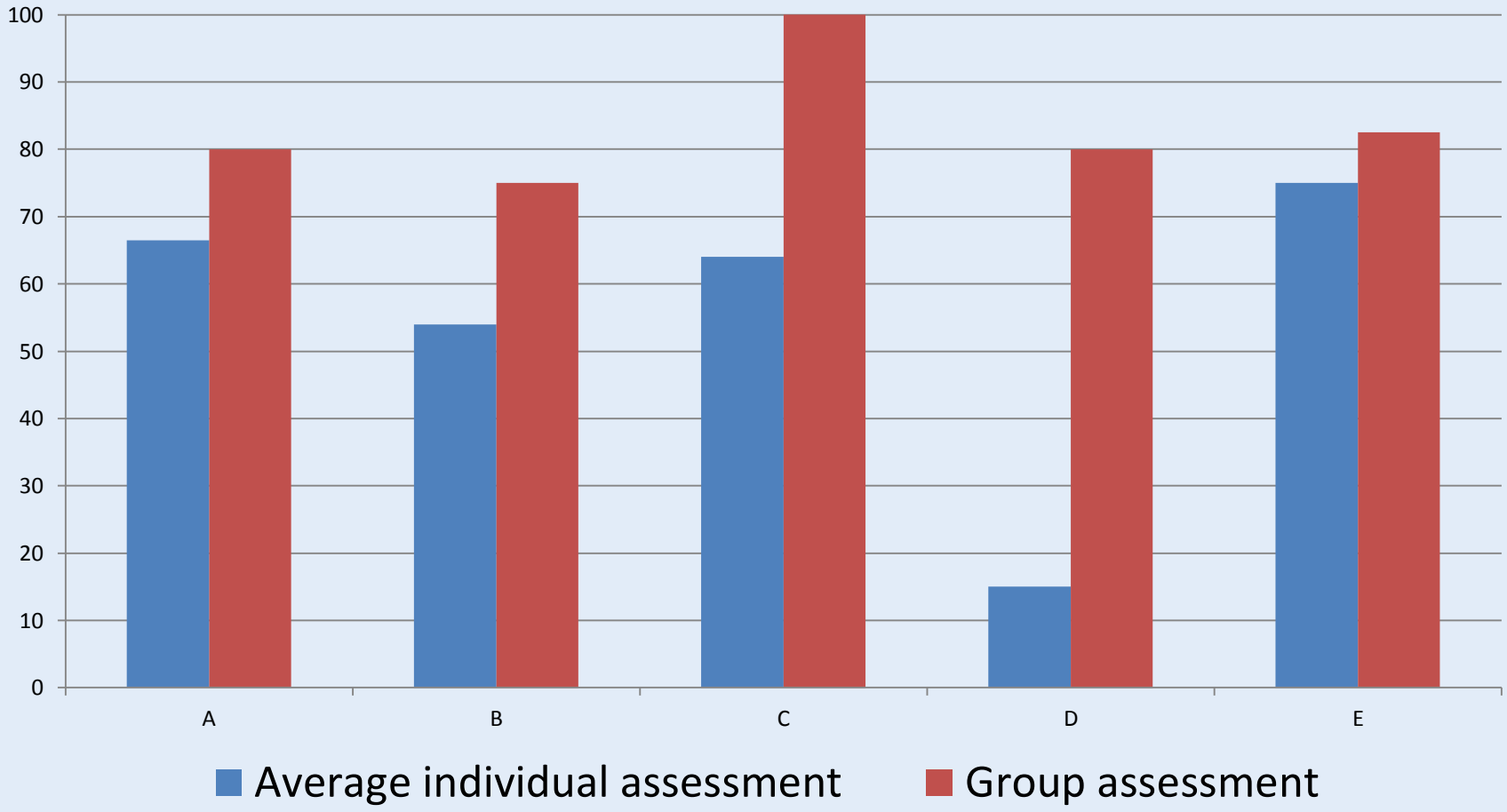
Assessment


100
80
60
40
20
0
A
B
C
D
E
Group assessment of group performance
Average of student's individual self-assessment
Tutor's assessment of group performance

Team and Individual Assessment
Research & Concept Generation Stage

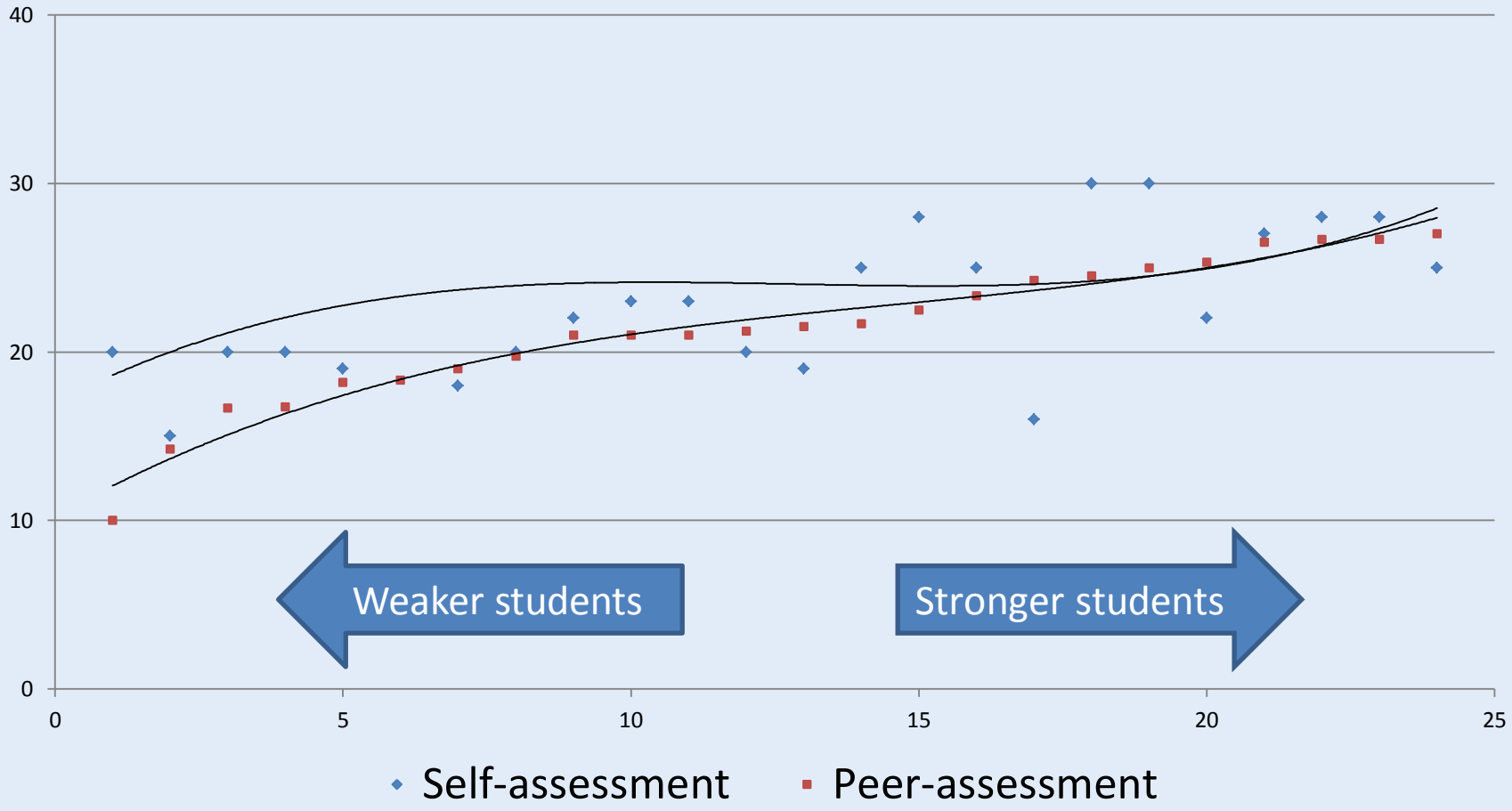


Team and Individual Assessment
Detailed Design and Prototyping Stage

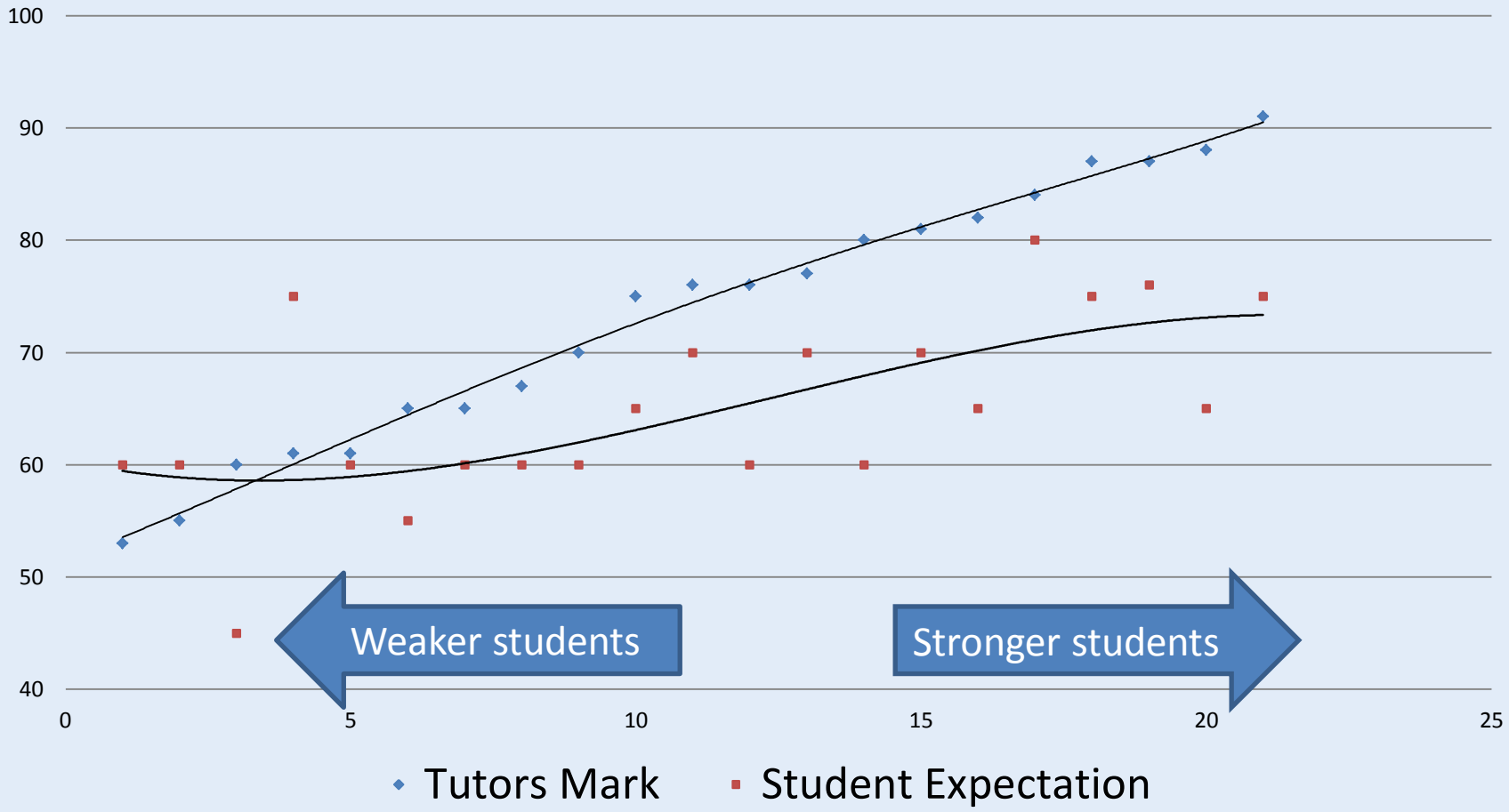


Project

Self- compared to Peer-Assessment



Module Exam


100
90
80
70
60
50
40
0
5
10
15
20
25
Weaker students
Stronger students
Tutors Mark
Student Expectation

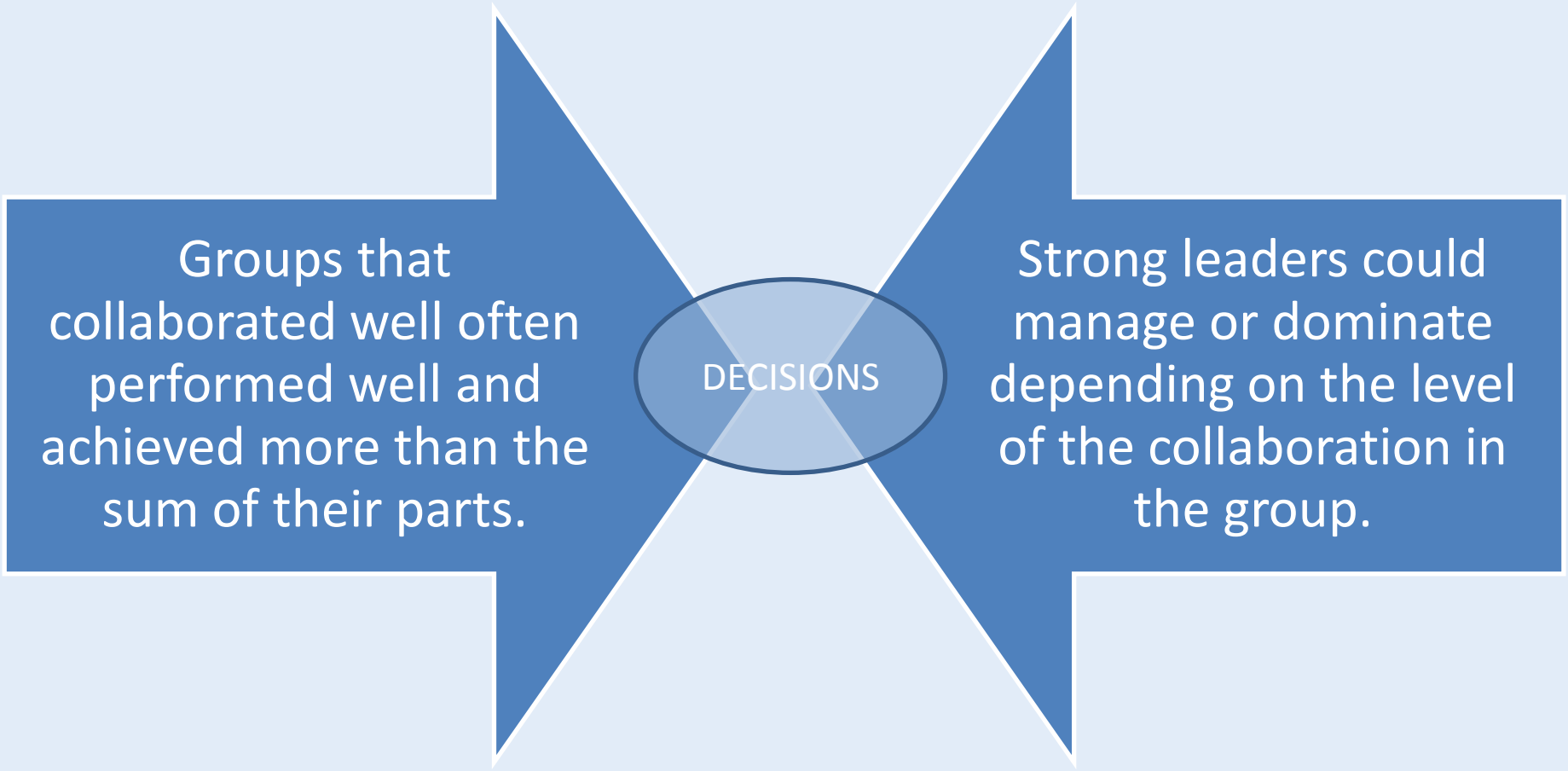
Makes the case for transparent assessment	• The learning process • The design process • The design product
Intended to inform practitioners	• The principle issues encountered
Enhance the collaborative experience	• Through the recognition • Communication • Reflection of the issues

Fewer issues in traditional problem areas such as

- Student motivation
- Initiative
- Quality of individual work

More issues related to

- Interpersonal relationships,
- Personal expectations in group-work
- Group dynamics
- Group management/decision making
- Pacing of the group project against a characteristic time schedule


Groups that collaborated well often performed well and achieved more than the sum of their parts.
DECISIONS
Strong leaders could manage or dominate depending on the level of the collaboration in the group.

Less emphasis on the product or outcome

More emphasis on the learning processes

Otherwise Students May.....

- Inadequately understand the processes and criteria involved in learning and assessment.
- Be poor at evaluating their own performance
- Overestimate their contribution to group activities

Boud D., Cohen R., and Sampson J. Peer Learning and Assessment, *Assessment & Evaluation in Higher Education*, 1999, 24(4), pp. 413-426

For Successful Collaborative Work

- Reward contribution and encourage peer learning
- Acknowledge that group learning is messy, appreciate the difficulties
- Allow time for reflection and non-thinking time for ideas to evolve and grow
- Structure assessment processes with clear guidelines, and prompt feedback
- Developing a shared interpretation of the design problem and the design process
- Share the passion for the practice of design
- Promote realistic expectations and performance evaluation
- Intervene to correct and moderate unrealistic expectations or distorted self-evaluation where necessary

Tasks a tutor must perform in collaborative learning include	Roles a tutor must play to accomplish this task include	Skills a tutor needs to carry out these roles include
• Helping the group to formulate a coherent picture of the topic • Sometimes redirecting the focus of discussion • Encouraging and supporting contributions from the group	• Observer • Leader/instructor • Neutral chair • Facilitator • Counsellor • Commentator	• Asking • Testing • Clarifying/elaborating • Bringing in and shutting out contributors • Turning questions back on the group

David Jaques summarised group learning as ‘learning to be’ rather than ‘learning about’

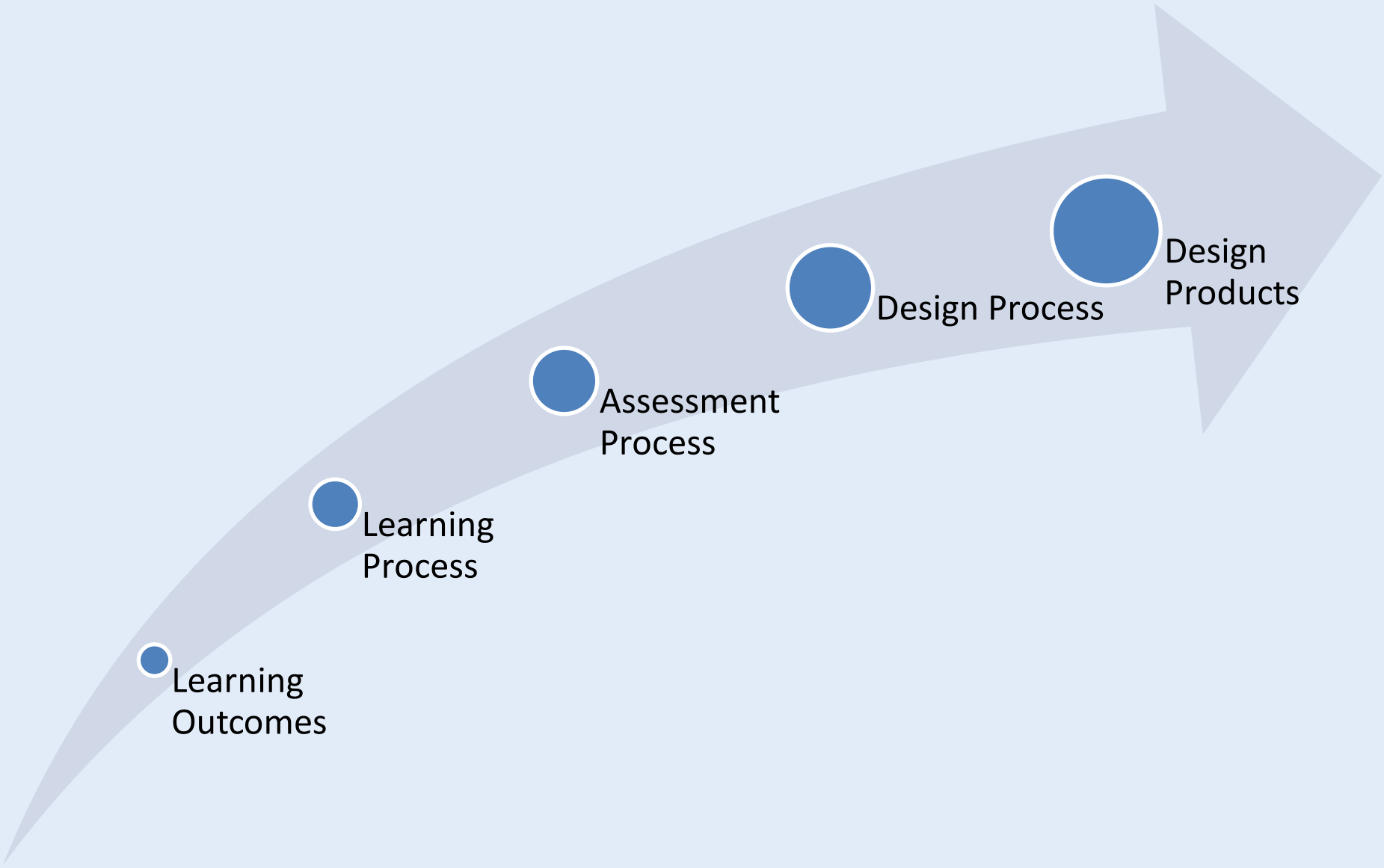
Collaborative group learning requires the creation of an all embracing context, the stage, for the individual ‘to be’ on

The set must be designed to encourage the development requisite behaviours, skills, and sensibilities needed to collaborate successfully

The roles are interchangeable, and the dialogue does not exist but will develop as the plot unfolds

The tutor gives the stage directions and writes the reviews

Jaques D. *Learning in Groups*, 3rd ed., 2000, Kogan Page, London.


Learning Outcomes
Learning Process
Assessment Process
Design Process
Design Products

Thank You