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## Task shifting, interprofessional collaboration and education in oral health care

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*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2018

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Reinders, J. J. (2018). *Task shifting, interprofessional collaboration and education in oral health care*. University of Groningen.

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# CHAPTER 6

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## Perceived interprofessional task distribution after a mixed student group formation intervention

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Reinders, J.J., Krijnen, W.P., Stegenga, B., Van der Schans, C.P. (2017).  
Perceived Dentist and Dental Hygienist Task Distribution After Dental  
and Dental Hygiene Students' Team Intervention.  
*Journal of Dental Education*, 81(4), 413-419.

**Abstract**

**Purpose** - Attitudes of dental students regarding the provision of treatment tend to be dentist-centered, however, facilitating mixed student group formation could change such perceptions. The purpose of this study is to investigate the perceived scope of practice of dental and dental hygiene students and whether task distribution can change following an educational intervention consisting of feedback, intergroup comparison and competition between mixed profession groups.

**Methods** - The study employed a pretest posttest single group design. Third-year dental students and second-year dental hygiene students were randomly assigned to mixed profession groups (four or five members) and received group-based performance feedback and intergroup comparison. The intervention was finalized with an award ceremony for the best interprofessional team. Before and after the intervention, students filled in a questionnaire measuring perceived distribution of ten tasks between dentists and dental hygienists.

**Results** - All students share perceptions regarding teeth cleaning ( $p=.372$ ,  $p=.404$ ) and, after the intervention, preventive tasks ( $p=.078$ ). Following the intervention, dental students considered four out of ten tasks as less dentist-centered: x-ray for periodontal diagnosis ( $p=.003$ ); local anesthesia ( $p=.037$ ); teeth cleaning ( $p=.037$ ); and periodontal treatment ( $p=.045$ ). Dental hygiene students perceived one task as being less dentist-centered after the intervention: x-ray for cariologic diagnosis ( $p=.041$ ).

**Conclusion(s)** - Dental and dental hygiene students have different opinions regarding the scope of practice. The number of redistributed tasks after the intervention is especially substantial among dental students, however, the amount of change per task is minimal. Half of all tasks become less dentist-centered as a result of the intervention.

**Introduction**

Dentists and dental hygienists work together and are, by changed legislation, allowed to perform a number of similar tasks that, traditionally, were only performed by dentists (Johnson, 2009). Attitudes of dentists regarding the provision of treatment tend to be dentist-centered and are present already at the undergraduate level (Ross et al., 2009; Lewitt et al., 2010). Such profession-specific mentalities regarding health care can reveal hierarchical perceptual differences that may complicate collaboration (Palaganas, Epps & Raemer, 2014; Morison et al., 2008; Ross et al., 2009). Dental students indeed perceive dental hygienists as assistants of dentists while dental hygiene students consider dental hygienists as independent professionals (Morison et al., 2008). The harmony of the intergroup relationship is least

threatened when professional groups concur with each other's distinctive characteristics (Hean et al., 2006). Interprofessional competition in response to task shifting can polarize the relationship between dentistry and dental hygiene (Knevel et al., 2016) and may lead to underutilization of the dental hygienist (Knevel et al., 2016; Capaciteitsorgaan, 2013). Such interprofessional competition is present already at the undergraduate level (Lewitt et al., 2010). Therefore, it is vital to improve the collaborative relationship between dental and dental hygiene students in order to optimize task distribution between these professions.

Dental and dental hygiene students having a reciprocal perception of each other as members of the same group rather than considering each other as members of distinct groups will likely facilitate a willingness to share tasks (Yukelson, Weinberg & Jackson, 1984; Guzzo, 1995). The mere existence of a group is based on the perception of unity and coherence between individuals and is referred to as entitativity (Campbell, 1958). Entitativity is based on three aspects: common fate, similarity, and proximity. Common fate can be enhanced by facilitating interdependence within a mixed profession group by group-based performance feedback (Rabinovich & Morton, 2015; Kim & Pentland, 2009; Matz & Wood, 2005; Smith & Kight, 1959). Similarity is enhanced by group identification which can be promoted by intergroup comparison (Turner & Bourhis, 1996) which should be based on an evaluative dimension related to the desired group identity (Ellemers & Van Knippenberg, 1997; Ouwerkerk & Ellemers, 2002); in this case, an interprofessional group identity. Group identification is also an indirect determinant of behaviors that may benefit in-group members (Bergami & Bagozzi, 2000). By introducing other groups (out-groups) that can be compared on a similar dimension, subgroup competition within a mixed profession group can also be avoided (Munkes & Diehl, 2003). According to the intergroup competition-intragroup cooperation hypothesis, cooperation within a group will increase due to competition with other groups (Böhm & Rockenbach, 2013). Proximity can be enhanced by composing small groups in which group cohesion is more likely to increase compared with larger groups (Widmeyer, Brawley, & Carron, 1990). Greater perceived cohesion produces more commitment to a group and is a direct determinant of behaviors that benefit in-group members (Bergami & Bagozzi, 2000). Thus far, no intervention has been investigated which is based on the combination of group-based performance feedback, intergroup comparison, and intergroup competition between mixed profession groups.

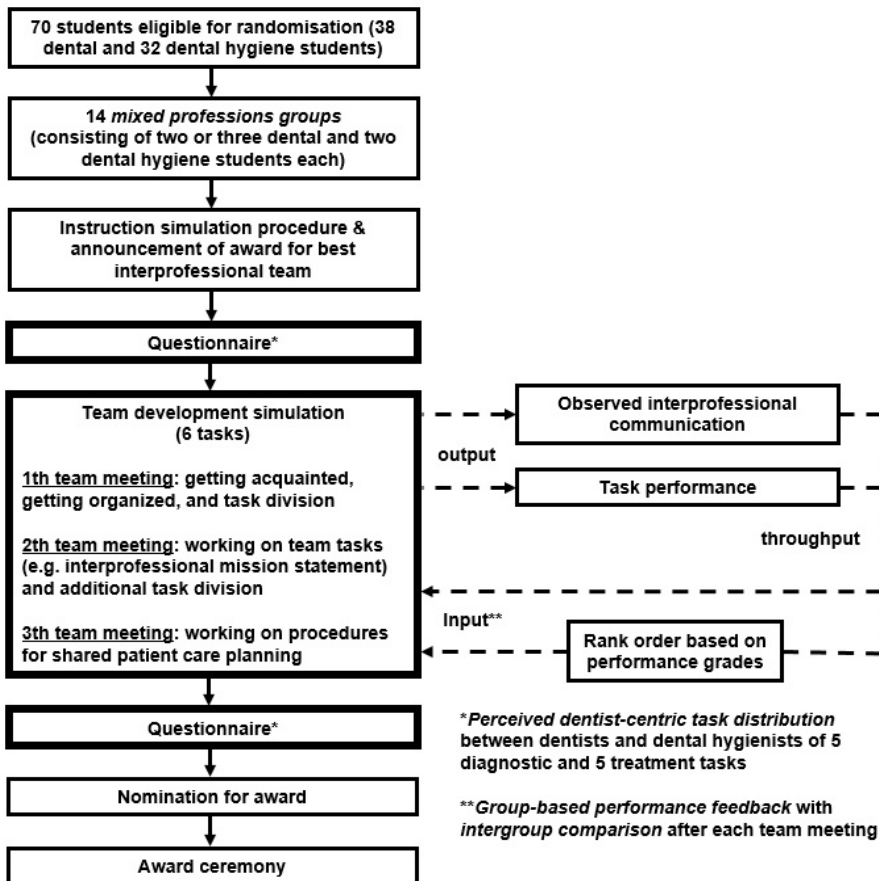
The purpose of this study is to investigate the perceived scope of practice of dental and dental hygiene students and whether distinguished interprofessional task distribution can change due to an educational intervention comprising the combination of group-based performance feedback, intergroup comparison, and intergroup competition between mixed profession groups.

**Materials and Methods**

The study employed a pretest posttest single group design (Figure 1). All participants were instructed about the study and informed they could withdraw at any given time. Full anonymity was guaranteed to all participants who were third-year dental students of the University of Groningen and second-year dental hygiene students of the Hanze University of Applied Sciences. The Institutional Review Board of the Hanze University of Applied Sciences approved this study.

**Figure 1.**

Flow chart of study design: mixed profession group formation facilitated by group-based feedback, intergroup comparison, and intergroup competition.



### *Characteristics and organization of the intervention*

The mixed profession groups simultaneously received group-based feedback on their group performance and were encouraged to compare their results with other mixed profession groups while participating in a competition during which the best performing interprofessional team was selected.

A convenience sample consisting of seventy dental and dental hygiene students were randomly allocated to groups consisting of five to six members (Figure 1). Each group worked autonomously in separate rooms and received the same tasks, objectives, and assessment criteria. Students were instructed to develop a collaborative practice. All groups were performing six team development tasks in three sessions of two hours each. The team development tasks consisted of an interprofessional mission statement, guidelines for task and role division, a plan to set up a practice space, a marketing plan, a legislation protocol (concerning a complaints procedure and professional responsibilities), and a collaboration protocol. Predefined criteria were provided to all students for each of these tasks. During the intervention, all groups received standardized feedback five hours after each group meeting. This group-based feedback concerned group dynamics (interprofessional equality), efficiency, and quality of work. After each group meeting, feedback was provided on the progress of each group in comparison to the other groups.

### *Questionnaires*

Before and after the team development sessions, students filled in a questionnaire regarding perceived task distribution between dentists and dental hygienists (Figure 1). The measurement of this task distribution between dentists and dental hygienists was based on a list of five diagnostic and five treatment tasks of which two tasks are invasive procedures (Table 1). An invasive procedure is a task or treatment that requires incision into the body or the removal of tissue. These tasks are allowed, according to Dutch legislation, to be performed by both dentists and dental hygienists (Jerkovic et al., 2010). The ten tasks were scored on a 9-point scale ranging from (1=) 'only belongs to the dental hygienist' to (5=) 'just as much a task of dentists as of dental hygienists' to 9= 'only belongs to the dentist'. To enhance further interpretation, values 1 through 3 were classified as 'dental hygienist core task' while values 7 through 9 were classified as 'dentist core task' or 'dentist-centered task'. All other values were classified as 'shared task'.

**Table 1.**

Tasks to distribute as perceived by dental and dental hygiene students

	<b>Task</b>	<b>Diagnosis or treatment</b>	<b>Invasive or non-invasive*</b>
1	Preventive tasks	Treatment	Non-invasive
2	Teeth Cleansing	Treatment	Non-invasive
3	Periodic Oral Evaluation	Diagnosis	Non-invasive
4	Cariologic X-ray	Diagnosis	Non-invasive
5	Periodontal X-ray	Diagnosis	Non-invasive
6	Cariologic Diagnosis	Diagnosis	Non-invasive
7	Periodontal Diagnosis	Diagnosis	Non-invasive
8	Cariologic Treatment	Treatment	Invasive
9	Periodontal Treatment	Treatment	Non-invasive
10	Local Anesthesia	Treatment	Invasive

\*An invasive procedure is a task or treatment that requires incision into the body or the removal of tissue.

### *Analyses*

The paired-sample t-test was employed separately for the dental and the dental hygiene group to analyze differences in mean perceived task distribution before and after intervention. The independent t-test was used to investigate differences between the two professions before and after the educational intervention with regard to perceived task distribution.

## **Results**

### *Participants*

In this study, 38 dental students (21 male, 17 female) and 32 dental hygiene students (1 male, 31 female) participated. Questionnaires were completed by a total of 88.4% (n=61) of the participants; more specifically, by 34 dental (89.5%) and 27 dental hygiene students (84.4%).

### *Comparison of dental and dental hygiene students: scope of practice*

In Table 2, group means and standard deviations of perceived task distribution are reported. It can be observed that dental and dental hygiene students perceive the scope of practice differently with one exception. Before and after the intervention, no significant difference in mean was determined between dental and dental hygiene students with regard to the distribution of teeth cleaning (p=.372 and p=.404). The group means indicate that both groups perceived this as a core dental hygienist task. Following the intervention, no differences were

ascertained between dental and dental hygiene students with regard to preventive tasks. Both student groups perceive this as a core dental hygienist task ( $p=.078$ ).

**Table 2.**

Comparison of task distribution between dentists and dental hygienists as perceived by dental and dental students

	Task	Before the experiment				Independent t-test	After the experiment				
		Dental students (n=34)		Dental Hygiene students (n=27)			Dental students (n=34)		Dental Hygiene students (n=27)		Independent t-test
		Mean	SD	Mean	SD	P	Mean	SD	Mean	SD	P
1	Preventive tasks	4.2	1.1	3.4	1.1	.009	3.7	1.3	3.2	1.2	.078
2	Teeth Cleansing	3.4	1.0	3.2	0.9	.372	2.8	1.2	2.6	1.2	.404
3	Periodic Oral Evaluation	6.7	1.2	5.2	1.5	<.001	6.9	1.4	5.1	1.5	<.001
4	Cariologic X-ray	6.8	1.4	6.2	1.0	.010	7.2	1.3	5.8	1.0	<.001
5	Periodontal X-ray	6.0	1.2	4.3	1.6	<.001	5.4	1.4	3.9	1.3	<.001
6	Cariologic Diagnosis	7.4	1.0	6.2	1.0	<.001	7.5	1.0	6.3	1.3	<.001
7	Periodontal Diagnosis	6.4	1.4	3.8	1.4	<.001	5.4	1.7	3.6	1.4	<.001
8	Cariologic Treatment	7.1	1.0	6.0	1.2	.001	7.2	1.1	6.2	1.2	<.001
9	Periodontal Treatment	4.9	1.3	3.3	1.7	<.001	4.3	1.5	2.9	1.3	<.001
10	Local Anesthesia	6.4	1.3	5.2	0.7	<.001	6.2	1.6	5.2	0.7	<.001

Perceived task distribution: 9-point scale ranging from 1= 'only belongs to the dental hygienist', 5= 'just as much a task of dentists as of dental hygienists', to 9= 'only belongs to the dentist'.



*Change after the experiment*

In Table 3, means and standard deviations of pretest and posttest measures of perceived task distribution are reported. It can be observed that means especially changed among dental students after the intervention. Four tasks are regarded as less dentist-centered among dental students after the intervention: periodontal x-ray ( $p=.003$ ); local anesthesia ( $p=.037$ ); teeth cleaning ( $p=.037$ ); and periodontal treatment ( $p=.045$ ). Dental hygiene students perceived one task as less dentist-centered after the intervention. X-ray for cariologic diagnosis was considered to be almost a core dentist task before the intervention whereas, after the intervention, this task was less profession-centered but more equally shared according to dental hygiene students ( $p=.041$ ).

**Table 3.**

Pretest and posttest measures of perceived task distribution between dentists and dental hygienists according to dental and dental hygiene students

Task	Dental students (n=32)			Dental Hygiene Students (n=27)		
	T0 Mean (SD)	T1 Mean (SD)	Paired Samples T-test P	T0 Mean (SD)	T1Mean (SD)	Paired Samples T-test P
1 Preventive tasks	4.1 (1.1)	3.7 (1.2)	.070	3.4 (1.1)	3.2 (1.2)	.421
2 Teeth Cleansing	3.5 (1.1)	3.1 (1.1)	.037	3.2 (0.9)	2.8 (1.1)	.054
3 Periodic Oral Evaluation	6.7 (1.2)	6.7 (1.3)	1.000	5.2 (1.5)	4.9 (1.4)	.235
4 Cariologic X-ray	6.9 (1.2)	7.0 (1.1)	.609	6.2 (1.0)	5.7 (1.0)	.041
5 Periodontal X-ray	6.1 (1.2)	5.3 (1.3)	.003	4.3 (1.6)	4.0 (1.3)	.403
6 Cariologic Diagnosis	7.3 (0.9)	7.5 (0.9)	.458	6.2 (1.0)	6.3 (1.4)	.787
7 Periodontal Diagnosis	6.3 (1.4)	6.0 (1.6)	.211	3.8 (1.4)	4.0 (1.5)	.542
8 Cariologic Treatment	7.1 (1.0)	7.0 (1.0)	.675	6.0 (1.2)	6.2 (1.2)	.434
9 Periodontal Treatment	4.8 (1.1)	4.3 (1.2)	.045	3.3 (1.7)	3.1 (1.2)	.294
10 Local Anesthesia	6.4 (1.3)	6.0 (1.2)	.037	5.2 (0.7)	5.3 (0.7)	.602

Perceived task distribution: 9-point scale ranging from 1= 'only belongs to the dental hygienist', 5= 'just as much a task of dentists as of dental hygienists', to 9= 'only belongs to the dentist'.

## Discussion

Dental and dental hygiene students had different perceptions on the distribution of the majority of professional tasks. After the intervention, consensus between dental and dental hygiene students increased by one additional task, specifically, preventive tasks. Teeth cleaning was considered a dental hygienist core task before and after the educational intervention while preventive tasks were only considered dental hygienist core tasks after the intervention.

The number of changed tasks among dental students is substantial, however, the degree of change per task is minimal. The perceived distribution of four out of ten tasks became less dentist-centered among dental students after the intervention. This concerned x-rays for periodontal diagnosis, local anesthesia, teeth cleaning, and periodontal treatment.

Dental and dental hygiene students have shared, but also different, perceptions with regard to their scope of practice. Historically, teeth cleaning has been the core task of the dental hygienist (Fones, 1934). Therefore, it is not surprising that no differences were found between the students of the two professions before and after the intervention. Internationally, dentists and professional dental organizations agree this is a dental hygienist core task (e.g., General Dental Council, 2013; Dental Council, 2010; Adams, 2004; Frandsen, 1986). Dental students perceive cariologic tasks especially as core dentist tasks. Another pattern is that diagnostic tasks and invasive tasks are also considered dentist core tasks. However, dental students only relinquish tasks that are not related to those that are cariologic. Yet, thorough oral examinations for disease (such as an x-ray for cariologic diagnosis) should be a component of dental hygiene practice when preventing cariologic disease is important (Barnes, 2005). Tasks related to this diagnosis and the treatment are perceived as a restricted area of the dental profession and are considered the most dentist-centered tasks before and after the intervention. Therefore, it is likely these tasks define the professional identity of the (future) dentist and their symbolic and distinctive value might be too significant to share (Omark, 1978). In other words, it is possible that changing interprofessional task distribution between dental and dental hygiene students is restricted to all non-cariologic tasks no matter what type of intervention is applied. The same could possibly apply to the dental hygiene profession. Dental hygiene students perceive prevention, teeth cleaning, and periodontal treatment as their core tasks. However, the dental hygiene profession is a professionalizing occupation and, therefore, cannot share the same characterization as the established dental profession. The Professional Project Model of Macdonald (1999) predicts that the priority of a professionalizing occupation or aspiring profession, such as dental hygiene (Adams, 2004), is to pursue social acceptance and, thus, full professional status with corresponding autonomy. On the other hand, the first priority of an aspiring profession is to claim a unique area of expertise while task shifting does the opposite; it enhances similarity between these professions. Retaining certain specific core tasks could be the solution for maintaining enough professional distinctiveness between dentistry and

dental hygiene.

The task distribution after the intervention, according to dental students, became slightly less dentist-centered with regard to more tasks compared to dental hygiene students. This is an indication that this specific intervention can influence the desired interprofessional equality. Previously, it was argued that the dominant profession would relinquish more tasks to the other profession when all are members of the same group. However, this effect is minimal. Still, both established and aspiring professions not only focus on the protection and maintenance of their occupational boundaries, they also want to expand areas of control (Macdonald, 1995, Larson, 1977). The need for professional control could possibly be somewhat decreased by the intervention. Continuing interprofessional education (IPE) might further enhance the desired effects. If so, this intervention should be applied for a longer time period. The theory behind this educational intervention requires additional research in order to substantiate its usefulness.

Increasing the duration of the intervention can plausibly produce greater effects; this type of intervention can also produce effects in a relatively short time (six hours in three sessions). The duration of an intervention to influence a shift of tasks and responsibilities between a GP and a practice nurse lasted sixteen hours in four sessions (Oeseburg et al., 2013). The application of the intergroup competition-intragroup cooperation hypothesis (Böhm & Rockenbach, 2013) to mixed profession group formation might be more effective than traditional discussion groups. However, it is unlikely that this will be sufficient since a group could also develop a harmonious but mutually maintained hierarchical culture. Therefore, a group culture of equality should also be influenced in order to guarantee both group commitment and interprofessional behavior. Conventional IPE often promotes the engagement of students by discussion whereas simulation-enhanced IPE facilitates student participation in a more realistic environment with more practical social interaction (Palaganas et al., 2014).

A limitation of this study is its pre-test post-test single group design. Without comparing experimental and control conditions, results must be interpreted with care. Perceived task distribution changed over time but was different per profession. Therefore, it is unlikely that the outcome of this study can be explained by maturation.

The pretest could possibly have influenced the outcome. However, students were not aware that 'perceived dentist-centered task distribution' was measured. Instead, task distribution between dentists and dental hygienists was measured with 'core dentist task' as the highest value. Therefore, it is unlikely the results can be explained by test reactivity.

All students were randomly assigned to their group. Therefore, it is unlikely that group composition was based upon already established relationships between members of the same profession.

Briefly, dental and dental hygiene students have different perceptions about the scope of practice. The number of redistributed tasks after the intervention is especially substantial among dental students, however, the amount of the change per task is minimal. Half of all tasks become less dentist-centered. This study provides an indication of the effect of an educational intervention based on group-based performance feedback, intergroup comparison, and intergroup competition between mixed profession groups can change perceived task distribution.

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