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Teacher interpersonal behaviour and student motivation in competence-based vocational education: Evidence from Indonesia

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HIGHLIGHTS

- Perceived teacher interpersonal behaviour (TIB) predicts student motivation.
- TIB connects competence-based education (CBE) and student motivation.
- Impact of TIB on student motivation is greater in less-CBE than in CBE context.

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ABSTRACT

Competence-based education requires changing teacher roles probably affecting teacher–student interactions and student motivation. This study examines how students ($N = 1469$) from competence-based and less-competence-based vocational schools perceive their teachers' interpersonal behaviour and its relation with their motivation. Results showed comparable teacher profiles in CBE and less-CBE schools, with an unexpected difference at the dimension level. Perceived teacher interpersonal behaviour moderated connections between CBE and student motivation, with greater impact in less-CBE than in CBE learning environments. Required changes in teacher roles are not yet perceived, hampering the expectations of increased motivation in competence-based education.

1. Introduction

Researchers in classroom learning environments have indicated the importance of teacher–student relationships in achieving student outcomes. Healthy teacher–student relationships are a prerequisite for engaging students in learning activities (Brekelmans, Sleegers, & Fraser, 2000). Researchers have investigated teacher–student relationships using an interpersonal perspective, that is studying teaching in terms of the relationship between teacher and students (Brok, 2001). Using this perspective, studies show that the way students perceive their teacher interpersonally (teacher interpersonal behaviour) relates to students' academic achievement (e.g., Brok, 2001; Goh & Fraser, 1998), attitude towards learning (e.g., Brok, Levy, Brekelmans, & Wubbels, 2005; Gupta & Fisher, 2011; Henderson & Fisher, 2008; Telli, den Brok, & Cakiroglu, 2007; van Uden, Ritzen, & Pieters, 2014), and students' learning motivation (Maulana, Opdenakker, den Brok, & Bosker, 2011; Maulana, Opdenakker, Stroet, & Bosker, 2013; Opdenakker, Maulana, & den Brok, 2012). Numerous studies have been done using the Questionnaire on Teacher Interaction (QTI) and have involved students from primary schools (e.g., Fisher, Waldrip, Dorman, & den Brok, 2007; Goh & Fraser, 1998), secondary schools (e.g., Gupta & Fisher, 2011; Maulana et al., 2011; Rickards, 1998; Rickards, den Brok, & Fisher, 2005), and higher education (e.g., Fraser, Aldridge, & Soerjaningsih, 2010) including teacher education programmes (e.g., Jong, Tartwijk, Wubbels, Veldman, & Verloop, 2013). Studies linking student perceptions of teacher interpersonal behaviour and learning outcome in vocational education are still limited (e.g., Henderson & Fisher, 2008; van Uden et al., 2014) while the number of vocational students is increasing (OECD, 2009).

In Indonesia, a limited number of studies using the QTI have been reported. Soerjaningsih, Fraser, and Aldridge (2002) explored the use of QTI in investigating teacher interpersonal behaviour in the

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context of Indonesian higher education. The instrument provided a valid instrument for management and computer classes. Later on, Maulana, Opdenakker, den Brok, and Bosker (2012) reported its validity for lower secondary education in Mathematics and English classes. Those studies confirm the importance of students' perception of their teachers' interpersonal behaviour for students' outcomes in Indonesia. While the QTI instrument has shown to be valid in the Indonesian context, little is known of studies using QTI to analyse teacher–student relationships in Indonesian vocational schools, particularly in competence-based education that is now rising in Indonesia. Indonesia, as is stipulated in the explanation of Indonesian Education Act No. 20 year 2003, employed the competence-based approach for its education system as a strategy to enhance its quality of education (MoNE, 2003; Utomo, 2005).

Investigating teacher–student relationships in competence-based vocational education is important since the competence-based concept in education is currently receiving more and more attention from educational researchers and practitioners worldwide (Illeris, 2009). CBE has a secured position in vocational education (Kouwenhoven, 2003) and is considered to be a powerful learning environment (De Bruijn & Leeman, 2011) for fostering learning and motivation, and better preparing students for their future (working) life. Learning environments in CBE classrooms, or CBE learning environments, typically focus on student-centred learning, and encourage students to be more self-directed and more responsible for their own career paths (Wesselink, Biemans, Mulder, & der Elsen, 2007). Consequently, CBE requires different roles of teachers and students compared to traditionally teacher-centred learning. Besides being a knowledge transmitter, teachers should also act as a coach in guiding students' learning (Biemans, Nieuwenhuis, Poell, Mulder, & Wesselink, 2004; Wesselink et al., 2007). As CBE requires different roles of teachers, differences pertaining to students' perceptions of teacher interpersonal behaviour can be expected.

CBE aims at reducing the number of students who discontinue their education programme due to loss of motivation (Wesselink, 2010). By offering a more challenging and authentic learning environment, a competence-based setting is expected to foster student motivation better than in traditionally teacher-centred education. As the way students perceive teacher interpersonal behaviour is also related to student motivation (Brok, 2001; Maulana et al., 2011) and CBE requires different roles for teachers and students, teacher interpersonal behaviour theory can provide a useful framework to give insight into how CBE objectives, i.e., student motivation, are fostered in CBE research. Further, studies concerning the connection between CBE and student motivation, which also utilize teacher interpersonal behaviour theory, have not yet been found. Thus, research on teacher interpersonal behaviour in competence-based vocational education will not only contribute to elaborating the knowledge base on teacher interpersonal behaviour in vocational education, but also to the development and successful implementation of competence-based education from the teacher–student interpersonal relationship perspective.

2. Theoretical frameworks

2.1. Competence-based learning environments and the changing roles of teachers

Competence-based education (CBE) has become a dominant trend in vocational education and training in several countries due to its expected decrease of problems in the transition from school to work and the expected positive effects on student learning and motivation (Biemans et al., 2004; Wesselink et al., 2007; Biemans et al., 2009). While competence-based education has become a popular development, research on its design is ongoing and its operationalisation in practice (i.e., how it should look like) still remains unclear (Wesselink et al., 2007). Dutch researchers have developed a framework that defines what a competence-based curriculum and the learning environment should look like. The framework is based on literature study and delphy study with educational experts and consists of eight principles describing the essential elements that characterise competence-based Vocational Education and Training in a Dutch context (Wesselink et al., 2007). This framework has been used to investigate educational programs in the Netherlands (e.g., Wesselink, Dekker Groens, Biemans, & Mulder, 2010), East Africa (e.g., Mulder, Eppink, & Akkermans, 2011) and in Indonesia (e.g., Nederstigt & Mulder, 2011).

Sturing, Biemans, Mulder, and De Bruijn (2011) validated this model with teacher practices, which led to a refinement of the framework into ten principles of CBE: (1) The study programme is based on core tasks, working processes and competences (the qualification profile); (2) Complex vocational core problems are central; (3) Learning activities take place in different concrete, meaningful vocational situations; (4) Knowledge, skills and attitudes are integrated in learning and assessment; (5) Students are regularly assessed for various purposes; (6) Students are challenged to reflect on their own learning; (7) The study programme is structured in such a way that the students increasingly self-steer their learning; (8) The study programme is flexible; (9) The guidance is adjusted to the learning needs of the students; (10) In the study programme attention is paid to learning, career and citizenship competences (Sturing et al., 2011). These ten principles provide both insight in what should be taught in CBE (principles 1–4) and how this should be done (principles 5–10). This framework complies with five levels of CBE implementation from non-competence-based to fully competence-based study programmes. This framework promises to be a useful tool to determine to what extent a learning environment is competence-based, regarding the level of implementation of the CBE principles.

In CBE, teacher roles become more complex (Biemans et al., 2004; Seezink & Poell, 2010; Wesselink, 2010). Besides acting as knowledge transmitters, teachers are encouraged to act as coaches and as sources of information while interacting with students. Teachers are expected to develop authentic learning tasks, for example, by creating classroom situations that resemble workplace/industrial situations. As teacher and student roles in competence-based education differ from the traditional teacher-centred learning, different student perceptions of teacher–student relationships are to be expected in competence-based learning environments compared with those of non competence-based learning environments. The characteristics of the CBE classrooms emphasise student-centred learning more strongly and require more cooperation between teachers and students. Studies show that students in more student-centred learning classrooms describe their teachers' behaviour as more helpful, friendly, understanding and less directive than in teacher-centred learning (Yu & Chen, 2012). Thus, those behaviours are expected to be shown more often in CBE than in the less-CBE schools. This, in turn, can be expected to differentially influence student learning and motivation in CBE as compared to non-CBE contexts. The large body of research on teacher interpersonal behaviour can shed useful information on if and how teacher interpersonal behaviour in CBE differs from non-CBE learning environments, and whether or not this relates to the expected CBE outcomes of improved learning and motivation.

2.2. Teacher interpersonal behaviour

Teachers use various communication strategies while teaching

their students in the classroom. Some teachers might try to be friendly to their students, while others keep more distance. Different strategies used by different teachers create different patterns of relationships between teachers and students. Within educational contexts, researchers conceptualised this teacher–student relationship in terms of teacher interpersonal behaviour. Wubbels, Creton, Brekelmans and Hooymayers (1987) developed an instrument to investigate teacher interpersonal behaviour, the Questionnaire on Teacher Interaction (QTI). The QTI was developed based on a robust theoretical as well as statistical consideration. The underlying theoretical framework is the general interpersonal theory of Leary (1957), often embedded in a systems approach to communication (Watzlawick, Beavin, & Jackson, 1967). Based on Leary's model for interpersonal diagnosis of personality (1957), Creton and Wubbels (1984) developed the Model for Interpersonal Teacher Behaviour (MITB). This model depicts and examines teacher–student relationships in terms of two interpersonal dimensions, namely 'Influence' referring to the degree to which a teacher controls communication in the classroom, and 'Proximity' referring to the degree to which a teacher cooperates with students. These two dimensions make up eight scales, that are originally adopted from the circular structure of Leary's model (Leary, 1957) (see Fig. 1).

Originally, the QTI was developed for use in the Dutch context (Creton & Wubbels, 1984). After four trial rounds involving statistical analyses, focus group interviews and think-aloud sessions with students and teachers on sample items, the final (original) Dutch version was constructed. The instrument consists of 77 items belonging to one of the eight scales of the Leary model. After the emergence of the Dutch QTI, the 64-items American version of the instrument was constructed, which showed a comparable quality with the original Dutch version (Wubbels & Levy, 1991). The American version has been widely used by international researchers to develop their own countries' versions (see Maulana et al., 2012 for a detailed review). The QTI has been the focus of over 100 learning environment studies and has been translated into over 15 languages (Brok, 2001; Maulana et al., 2012). The Indonesian version used in this study was also developed based on the American version.

Teachers, while interacting with their students, might be viewed exhibiting behaviours as represented in the QTI scales to different degrees. For example, a teacher might be perceived as having a high score in the scale of helpful, low in the strict scale, moderate in the giving students freedom scale, etcetera. In the QTI, the scale scores

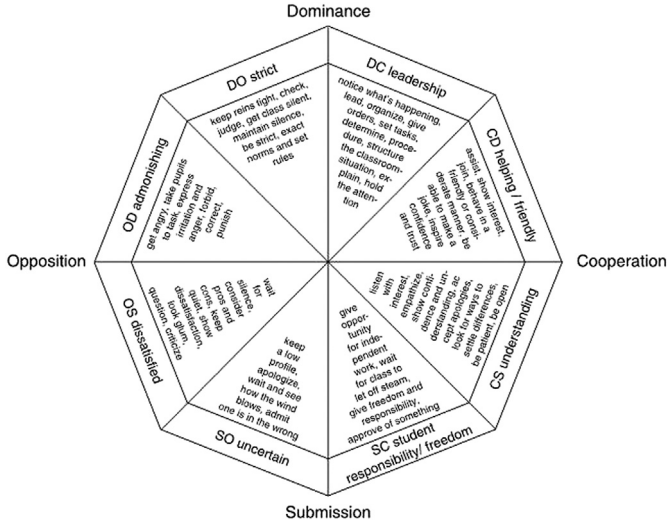

Fig. 1. The Model for Interpersonal Teacher Behaviour (MITB; Wubbels & Brekelmans, 2005).

are reported in a range from zero to one, with 'one' indicating that all behaviours in a scale are always present and 'zero' indicating the absence of scale behaviours (Brok, Brekelmans, & Wubbels, 2004; Maulana et al., 2011; Wubbels, Creton, Levy, & Hooymayers, 1993). The combinations of the eight-scale scores form a particular communication pattern of a teacher, called a teacher interpersonal profile that is usually depicted in a graph (Wubbels et al., 1993; Wubbels & Brekelmans, 2005). Brekelmans, Levy, and Rodriguez (1993) examined the variety of interaction patterns from the large data set of Dutch secondary teachers and from 94 classes in the United States, and identified eight distinctive interpersonal profiles: Directive, Authoritative, Tolerant/Authoritative, Tolerant, Uncertain/Tolerant, Uncertain/Aggressive, Repressive and Drudging (Brekelmans et al., 1993) (see Fig. 2). The profiles of Directive, Authoritative and Tolerant/Authoritative shared about the same amount of Influence but differ in the amount of Proximity. The Tolerant/Authoritative teacher is considered the most cooperative while the Directive teacher is the least cooperative due to relatively low scores on *helpful/friendly* and *understanding* but high score on *strict*. The Tolerant teacher is about as *helpful/friendly* and *understanding* as the Authoritative teacher, but they differ on the degree of *leadership* and *strictness* (Brekelmans et al., 1993; Maulana et al., 2011).

Besides appearing in Dutch and American classrooms, the eight profiles were also found in various countries with different frequencies of occurrence. Wei, den Brok, and Zhou (2009) reported the existence of six profiles in Chinese secondary classes, excluding Tolerant and Uncertain/Tolerant, with the Tolerant/Authoritative as the most common profile. Maulana and colleagues (2011) reported all eight profiles to be found in Indonesian Mathematics and English classes in Junior Secondary Schools with the Directive as the most common profile. The major prevailing profiles of secondary teachers in Australia, Singapore and Brunei were Authoritative, Tolerant/Authoritative and Directive profiles (den Brok, Fisher, Brekelmans, Rickards, Wubbels, Levy, & Waldrip, 2003). In general, the typology of the eight profiles (i.e., the combination of scale scores) is comparatively stable and applicable to various countries. The most common profiles are the Directive, Authoritative, Tolerant and Tolerant/Authoritative profiles (Brok et al., 2003; Telli et al., 2007; Wei, et al., 2009).

2.3. Students' perceptions of teacher interpersonal behaviour and learning motivation

Studies show the way students perceive their teacher's interpersonal behaviour, as assessed using the QTI (Wubbels, Creton, Brekelmans, & Hooymayers, 1985), is related to students' learning motivation. Brekelmans and Wubbels (1991) reported that when students perceive their teacher as friendly/helpful, they reported high levels of learning motivation. van Amelsvoort (1999) elaborated on these findings showing that helpful/friendly and understanding teachers correlated positively with indicators of students' motivation: pleasure, relevance, confidence, and effort. Studies analysing the relationships between the QTI dimensions and student motivation found that proximity and influence dimensions were associated positively with students' enjoyment and interest in science in Turkish science classes (Telli et al., 2007). Maulana and his colleagues (2011) reported that the influence and proximity had moderate correlations with motivational scales in Indonesian Mathematics and English classes. In the Dutch vocational educational system, van Uden et al. (2014) stated that when students perceived their teachers as having high scores on the two dimensions, they reported high in learning engagement. Both dimensions positively contributed to students' engagement with proximity proving more important for engagement than influence.

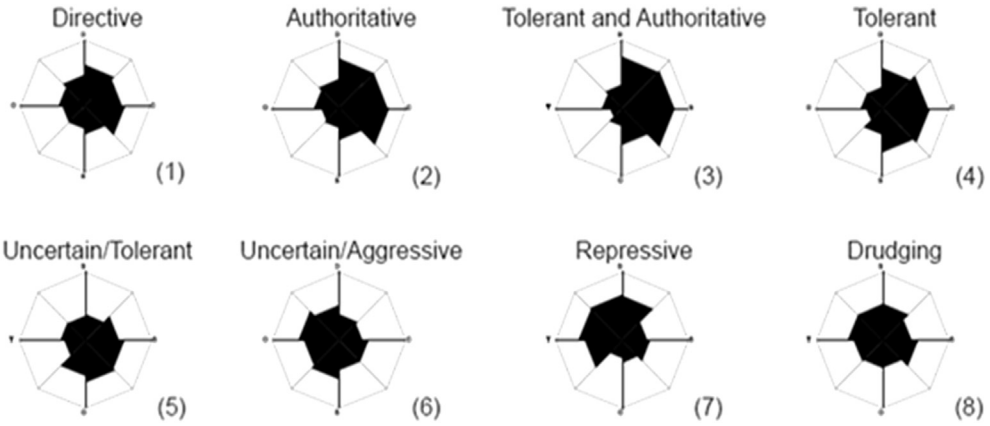

Fig. 2. Profiles of Teacher Interpersonal Behaviour.

In general, effects of proximity are somewhat stronger than effects of influence on student motivation (Wubbels & Brekelmans, 2005).

The connections between teacher interpersonal profiles and student motivation variables were also reported. Brekelmans et al. (1993) reported that Directive and Tolerant profiles positively correlate with students' engagement and motivation in the classroom. High motivation had been found in classes of Authoritative, Tolerant/Authoritative and Directive teachers, while low motivation occurred in classes of Drudging and Uncertain/Aggressive Teachers (Telli et al., 2007).

Related to student learning motivation, Vansteenkiste, Simon, Lens, Sheldon and Deci (2004) identified types of motivation: extrinsic, introjected, identified, and intrinsic motivation (Vansteenkiste et al., 2004). In this present study, examining student motivation focuses on intrinsic motivation, as intrinsic motivation is found to have a high association with the dimensions of teacher interpersonal behaviour (Maulana et al., 2012). Intrinsic motivation, in turn, is often found to positively relate to student outcomes (Skinner & Belmont, 1993). Ryan and Deci (2000) defined intrinsic motivation as doing something because it is inherently interesting or enjoyable. They theorised several aspects contributed to intrinsic motivation including *interest*, *perceived competence*, *perceived value*, and *felt pressure* (Deci & Ryan, 2007). Perceived competence and value/usefulness are theorised as positive predictors of intrinsic motivation while pressure and tension are negative predictors of intrinsic motivation. This study examines the association between the two dimensions of teacher interpersonal behaviour, in competence-based education (CBE) or less-CBE schools and the aspects of student intrinsic motivation as shown in the Ryan and Deci motivation subscales (Ryan & Deci, 2000; Deci & Ryan, 2007).

3. Research questions

This study attempts to answer the following questions:

1) How do students in Indonesian vocational education, in either competence-based (CBE) or less-competence-based (less-CBE) learning environments, perceive their teacher's interpersonal behaviour?
2) Is the relationship between CBE, or less-CBE, and intrinsic motivation in Indonesian vocational schools moderated by how students perceive their teachers' interpersonal behaviour?

To our knowledge, studies pertaining to the connection between competence-based education, student intrinsic motivation, and teacher interpersonal behaviour have not been found to date. This study will be the first to explore the connections among those aspects. In exploring this issue, the interpersonal behaviour theory promises a valuable framework for exploring if teachers in CBE compared to less-CBE context indeed display different behaviour as perceived by their students. Moreover, as CBE is theorised to be more motivating, we hypothesise that students in CBE schools will report their intrinsic motivation higher than students in less-CBE schools. Lastly, we will explore whether student intrinsic motivation in CBE compared to less-CBE is moderated by the way students perceive teacher interpersonal behaviour.

4. Methodology

4.1. Participants

Data for this study were gathered from 49 agribusiness classes taught by 87 vocational core-subject teachers from fifteen agricultural vocational schools in the three most populated provinces in Indonesia. The selected school samples were chosen on the basis of being public and accredited providing an agribusiness study programme. Both the research as well as the school samples were approved by the Indonesian Ministry of Education and Culture and based on informed consent of all respondents. The selection of these fifteen schools was taken from previous research identifying the *competentiveness* score (Sturing et al., 2011) of 41 Indonesian agricultural vocational schools by collecting evidences and information from students, teachers and the school principals regarding the ten principles of Competence-Based Education (Misbah, Gulikers, Mulder, & Dharma, 2013). Competentiveness score refers to what extent the CBE principles (e.g., self-directed learning, student-centredness, authentic tasks) existed at schools. Of the fifteen schools, seven schools had a competentiveness score around 2 (categorised as less-CBE) and eight schools were around 4 to 5 (categorised as CBE). Prior to data collection, the first researcher obtained permission from school principals and teachers of selected schools to conduct this study at their schools.

Of these schools, class size varied from 14 to 38 students, with an average of 30 students. A total of 1469 students ranging in age from 14 to 20 years ($M = 16.2$; $SD = 1.02$) participated. Of the students, 872 were girls and 597 were boys, 765 were in their first year of vocational education (grade ten), 367 were in the second year, and 337 were in their third year (grade twelve). The participation of the schools was on a voluntary basis, while students got a small gift for their participation.

4.2. Instrumentation

All students responded to two questionnaires: the Questionnaire on Teacher Interaction (QTI; Wubbels et al., 1987; Wubbels &

Levy, 1991) and the Intrinsic Motivation Inventory (IMI; Deci & Ryan, 2007). The QTI as devised by Wubbels and Levy (1991) contained 64 items on a 5-point Likert scale from (1) never to (5) always. Previous work done by Maulana and colleagues (2012) tested the QTI in the Indonesian context via interviews with teachers and pilot-testing it with Junior Secondary students in Mathematics and English classes. This led to deleting some items as they were not valid or representative in the Indonesian context (e.g.,'It is easy to pick a fight with this teacher'), and adding a few items because some behaviours did not exist in the original context (i.e., the Netherlands) while they were prominent in the Indonesian culture (for example: 'When this teacher comes to the class, we have to stand and greet him'). The final, valid and reliable Indonesian QTI consisted of 57 items (Maulana et al., 2012).

To check the quality of the QTI used for Indonesian vocational (agricultural) education, guidelines of Brok (2001) and Maulana et al. (2012) are used. First, reliability tests were calculated at the scale level to identify problematic items, after which an exploratory factor analysis was conducted to check the existence of the two QTI dimensions. Problematic items in terms of internal consistency were checked by looking at the average inter-item correlations (Field, 2013). The item '*this teacher closes the door before starting the lesson*' decreased the Cronbach's alpha coefficient in the scale of '*strict*'. Furthermore, this item did not match with the particular characteristics of the agricultural classroom as teaching and learning process in this agricultural setting often happened outside for the whole period. Students might have been confused in responding to this item and so it was removed for further analysis. The items '*this teacher worries if students do not do assignments*' and '*this teacher trusts us*' were also problematic in terms of internal consistency and therefore dropped for further analysis. After deleting those three problematic items, the questionnaire used in this study consisted of 54 items.

As suggested in previous works (Brok, 2001; Maulana et al., 2012), construct validity of the QTI 54 items solution was checked by looking at the presence of the underlying two dimensions on the eight scales. An exploratory factor analysis (EFA) was conducted using the eight scales to examine whether or not the two dimensions (Influence and Proximity) were evident. To see if the eight scales make up the two dimensions, because of the circular relationship between the scales (seen in the teacher profile graphs, see Fig. 2), this EFA should lead to two factors with a certain pattern of the scale loadings combined with higher correlation between neigbouring scales and low correlations between scales in the other parts of the circular structure profile. Results from the EFA with varimax rotation corroborated the two dimensions as provided in Appendix 1. The EFA identifies two factors (*eigenvalues* larger than 1.0) that explained 57% of the variance, which is acceptable in human sciences (Stevens, 2002), and both the scale loading patterns and the correlations patterns (see Appendix 2) resemble to earlier studies on the QTI. The EFA results were largely in agreement with results reported by a previous study in the Indonesian context (Maulana et al., 2012). To graphically map teachers in a teacher profile, the mean scores of the scales were used (see also Wubbels et al., 1993). For this reason, the Cronbach's alpha of the scales were checked. These were satisfactory (Field, 2013) ranging from 0.60 to 0.80. Table 1 displays those values as well as a worded example of an item representative of each scale. Thus, as the quality checks of the QTI resemble the results of other studies, the Indonesian QTI for this present study provided a reliable and valid instrument for an Indonesian vocational schools context.

The second questionnaire used in this study was the Intrinsic Motivation Inventory (IMI) by Deci and Ryan (2007). The IMI assessed students' self-ratings of their *interest/enjoyment*, *perceived competence*, *felt pressure/tension*, and *perceived value/usefulness* of a subject taught by their teacher. First, the original 25 items on a 7-point Likert scale rating from (1) not all true to (7) very true were translated into Indonesian and back-translated into English by the first author and three teachers of English as a Foreign Language. The instrument was pilot-tested by thirty two vocational students to check its readability. After some corrections, the Indonesian IMI was administrated for data collection to the sample as described earlier. Results from exploratory factor analysis of the 25 items showed the five factors (*eigenvalues* larger than 1.0) with the four factors matching with the IMI subscales. Two items formed a new undefined factor and one item that originally belonged to subscale *perceived competence* deviated to subscale *felt pressure/tension* (see Appendix 3). Those three problematic items were removed for further analysis (Field, 2013). Finally, the 22 items measuring four intrinsic motivation subscales were used. The Cronbach's alpha coefficients of the subscales ranged from 0.65 (*felt pressure/tension*) to 0.86 (*perceived value/usefulness*) (see Table 2).

Table 1
The QTI scales, example of items and reliability (Cronbach's alpha).

Scale name	Example of items	Cronbach's alpha
DC – Leadership	This teacher acts confidently.	0.73
CD – Helpful/friendly	This teacher is friendly.	0.75
CS – Understanding	This teacher is patient.	0.78
SC – Student Freedom	We can influence this teacher.	0.61
SO – Uncertain	This teacher is hesitant.	0.60
OS – Dissatisfied	This teacher is suspicious.	0.74
OD – Admonishing	This teacher gets angry quickly.	0.80
DO – Strict	This teacher is strict.	0.61

The surveys were administrated in the middle of the first semester to ascertain that students and teachers had time to get to know each other. During the data collection, teachers were not present in the classroom, to minimise bias responses. Students were also informed that their teachers would not read student responses individually.

4.3. Data analysis

To obtain the profiles of teacher interpersonal behaviour, we firstly computed the mean scores and their standard deviations of the eight QTI scales, and continued with calculating the two dimensions scores.[1] The scale scores were then transformed into a value between 0 and 1 representing the range of the scale (Brok et al., 2004; Maulana et al., 2011; Wubbels et al., 1993). Next, the transformed scale scores were presented in graphical profiles. The graphical profiles then were compared to which profiles they were nearest to, using the clustering profiles based on Brekelmans' typology (Brekelmans et al., 1993; Brok, Wubbels, Veldman, & Tartwijk, 2010).

A MANOVA test in SPSS 19 for Windows was performed to examine whether there were differences in the two different learning environments (CBE and less-CBE) by comparing the dimension scores from the two groups. For the MANOVA test, the two QTI dimension scores were the dependent variables and CBE (CBE schools was coded as 1; less-CBE was coded as 0) was the independent variable.

To answer the second research question, teacher–student relationships were analysed on the basis of dimension scores. Using Pillai's trace criterion for its robustness (Field, 2013), a MANOVA test investigated whether students' ratings on the four motivation subscales of IMI differed in CBE compared to less-CBE schools. Follow-

[1] Notes: The dimension scores were calculated as follows (with the numbers before the scale labels representing the factor loadings): *Influence* = (0.92*DC) + (0.38*CD) − (0.38*CS) − (0.92*SC) − (0.92*SO) − (0.38*OS) + (0.38*OD) + (0.92*DO); *Proximity* = (0.38*DC) + (0.92*CD) + (0.92*CS) + (0.38*SC) − (0.38*SO) − (0.92*OS) − (0.92*OD) − (0.38*DO) (Wei et al., 2009).

Table 2
IMI Subscale, sample item, and reliability (Cronbach's alpha).

Subscale	Example of items	Cronbach's alpha
Interest/enjoyment	I enjoyed the subject taught by this teacher very much.	0.80
Perceived Competence	I think I am pretty good at this subject.	0.77
Felt pressure/tension	I felt pressured into taking this subject.	0.65
Value/Usefulness	I think taking this subject is useful for my future career.	0.86

Table 3
The QTI dimension score and standard deviation in CBE and less-CBE schools.

Dimension	CBE		Less-CBE		F	Sig.
	M	SD	M	SD		
Influence	0.88	0.36	0.76	0.37	68.79	0.00
Proximity	0.84	0.61	0.81	0.69	1.74	0.19

Note: Dimension score ranges between −3 and +3. Score 0 represents equal amounts of dominance and submissiveness (for influence), cooperation and opposition (for proximity). Range of the dimension scores are: 0 – 0.5 (moderately positive), 0.5 – 1.00 (positive) and above 1 (very positive) (Brok, Brekelmans & Wubbels, 2004).

Table 4
The mean score and standard deviation of IMI subscales in CBE and less-CBE schools.

IMI subscale	CBE		Less-CBE		F	Sig.
	M	SD	M	SD		
Interest/enjoyment	5.43	0.99	5.26	1.16	16.93	0.00
Perceived competence	4.69	0.97	4.66	1.06	0.86	0.35
Felt Pressure/tension	3.01	1.31	2.90	1.27	4.54	0.03
Value/Usefulness	6.31	0.79	6.13	0.92	30.28	0.00

Note: (1) not at all true – (7) very true.

up univariate ANOVAs examined which motivation subscales were different between the two groups. Then a MANCOVA test was conducted to see whether the two QTI dimension scores were related to the four motivation subscales and if this effect was moderated by a CBE versus a less-CBE context. In the MANCOVA test, the motivation subscales were used as the dependent variables, CBE as the fix factor and the QTI dimensions (i.e., Proximity and Influence) as the covariates. Follow up analyses further investigated whether the correlations between motivation subscales and QTI dimensions differed in CBE and less-CBE schools using a Fisher's Z transformation (Field, 2013). This compared the correlation coefficients of the motivation subscales and the dimension scores in CBE and less-CBE schools.

5. Results

This section first presents the statistics of the dimension scores. Next, the profiles of teacher interpersonal behaviour in competence-based and less-competence-based learning environments are presented. The MANOVA and MANCOVA results provide insights into the associations between teacher interpersonal behaviour, which focused on the two dimension scores, and students' learning motivation.

5.1. Teacher interpersonal behaviour in Indonesian agricultural vocational schools

The first research question of this paper dealt with how students from CBE and less-CBE learning environments perceive their teachers' interpersonal behaviour, and whether or not the perceptions differ between those two learning environments. Table 3 presented dimension scores in CBE and less-CBE classes.

The dimension scores of Influence indicated the amounts of perceived dominance, while Proximity indicated the amounts of perceived cooperativeness. Based on the results presented in Table 3, the Influence scores (CBE: $M = 0.88$, $SD = 0.36$; less-CBE: $M = 0.76$, $SD = 0.37$) were in the range of 0.5–1.0 showing that students both in CBE and less-CBE schools perceived their teachers as dominant. The proximity scores (CBE: $M = 0.84$, $SD = 0.61$; less-CBE: $M = 0.81$, $SD = 0.69$) also in the range of 0.5–1.0 showing that students perceived their teachers as cooperative both in CBE and less-CBE schools.

Fig. 3 shows that the patterns of teacher interpersonal behaviour in CBE and less-CBE learning environments were quite similar, and roughly nearest to the profile of tolerant/authoritative in the Brekelmans's typology (Brekelman et al., 1993; Brok, Taconis, & Fisher, 2010).

MANOVA results indicated a significant difference at dimension level. The score for the influence dimension (i.e., the degree of teachers' dominance) was significantly different in CBE and less-CBE schools, $F(1, 2983) = 68.79$, $p = 0.00$. Students from CBE learning environments perceived their teachers as more dominant than students from less-CBE schools. There was no significant difference for the proximity dimension, $F(1, 2983) = 1.74$, $p = 0.19$, showing that students both in CBE and less-CBE schools perceived their teachers as having the same degree of cooperativeness.

5.2. Association between student perception of teacher interpersonal behaviour and student intrinsic motivation in CBE and less-CBE learning environments

The second research questions dealt with the associations between teacher interpersonal behaviour and students' intrinsic motivation, as assessed using the four subscales in the IMI, in CBE

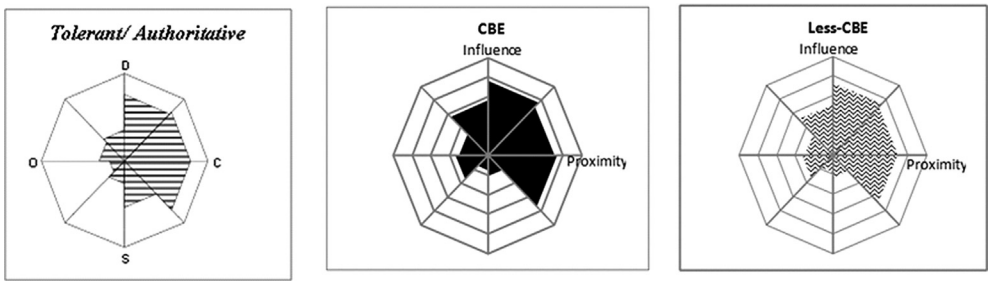

Fig. 3. Tolerant/Authoritative profiles in CBE & less-CBE.

Table 5
Interaction effects of CBE and QTI dimensions on the IMI subscales.

Variable	Intrinsic motivation subscales											
	Interest/enjoyment			Perceived competence			Felt pressure/tension			Value/Usefulness		
	B	SE	Sig.	B	SE	Sig.	B	SE	Sig.	B	SE	Sig.
Intercept	3.95	0.07	0.00	4.01	0.09	0.00	3.39	0.11	0.00	5.14	0.07	0.00
CBE	−0.07	0.10	0.44	0.01	0.11	0.91	−0.12	0.14	0.38	0.27	0.09	0.00
Influence	0.88	0.08	0.00	0.40	0.90	0.00	0.43	0.11	0.00	0.98	0.07	0.00
Proximity	1.07	0.07	0.00	0.58	0.08	0.00	−0.48	0.10	0.00	0.83	0.07	0.00
CBE × Influence	−0.14	0.11	0.21	−0.16	0.13	0.21	0.04	0.16	0.82	−0.41	0.10	0.00
CBE × Proximity	−0.04	0.09	0.63	−0.18	0.11	0.09	0.00	0.13	0.99	−0.37	0.08	0.00
Influence × Proximity	−0.27	0.08	0.00	−0.21	0.09	0.02	−0.47	0.11	0.00	−0.48	0.07	0.00
CBE × Influence × Proximity	0.26	0.10	0.01	0.40	0.12	0.00	−0.00	0.15	0.99	0.42	0.09	0.00

and less-CBE learning environments. First, a MANOVA examined the difference in IMI scores in CBE versus less-CBE contexts. Using Pillai's trace criterion (Field, 2013), competence-based education had a significant effect on students' intrinsic motivation, $V = 0.01$, $F(4, 2977) = 11.49$, $p = 0.00$, indicating that at least one of the four IMI subscales differed in CBE and less-CBE schools. Follow up *univariate* tests (see Table 4) showed that students from CBE schools scored significantly higher on the subscales interest/enjoyment, $F(1, 2983) = 16.93$, $p = 0.00$, perceived values/usefulness, $F(1, 2983) = 30.28$, $p = 0.00$, and significantly lower on the subscale felt pressure, $F(1, 2983) = 4.54$, $p = 0.03$ compared to students in less-CBE schools. There was no significant difference for the subscale of perceived competence $F(1, 2983) = 0.86$, $p = 0.35$.

MANCOVA tests showed a significant interaction effect of learning environment and perceived teacher interpersonal behaviour on the four intrinsic motivation subscales, $V = 0.08$, $F(4, 2971) = 6.15$, $p = 0.00$. Table 5 showed the effect of the three-way interaction of CBE × influence × proximity was significant for the subscales interest/enjoyment ($p = 0.00$), perceived competence ($p = 0.05$) and perceived value/usefulness ($p = 0.00$) and not significant for the subscale felt pressure ($p = 0.98$). The main effect of CBE remained only significant for the subscale of perceived value/usefulness ($p = 0.00$), while the main effect of proximity and influence was significant for all of the four subscales. These results indicated that students' higher scores on the intrinsic motivation subscales in CBE contexts were due to the interaction between the learning environment and students' perceived proximity and influence of their teacher. Thus, the association between competence-based education and students' intrinsic motivation was moderated by how students perceived their teachers' interpersonal behaviour.

Follow up analyses gave more insight into where the differences in the MANCOVA test actually come from. The results displayed in Table 6 confirmed the associations between student intrinsic motivation and teacher interpersonal behaviour dimensions with the Fisher's Z tests showing that correlations between both QTI dimensions on the one hand, and the four IMI subscales on the other hand, differ in CBE and less-CBE learning environments. All four intrinsic motivation subscales correlated significantly with proximity, but these correlations differed significantly between CBE and less-CBE schools for interest/enjoyment, $z = -6.67$, $p = 0.00$, perceived competence, $z = -3.04$, $p = 0.00$, and perceived value/usefulness, $z = -1.99$, $p = 0.04$. In all these cases, the correlations were stronger in the less-CBE than in the CBE contexts. Felt pressure correlated negatively with proximity in CBE and less-CBE context, but this correlation did not significantly differ between the two learning environments, $z = 1.99$, $p = 0.23$. Three motivation subscales correlated significantly and positively with the influence dimension (see Table 6). These correlations were stronger in the less-CBE context for the motivation subscales interest/enjoyment, $z = -5.08$, $p = 0.00$, and perceived competence, $z = -3.08$, $p = 0.00$.

In short, students in a competence-based education context showed higher intrinsic motivation, however, the effect of a CBE or less-CBE learning environment on student intrinsic motivation was moderated by how students perceived their teachers. Proximity moderated the effects of CBE and less-CBE for three intrinsic motivation subscales, compared to two subscales for influence. Moreover, this effect was stronger in a less-CBE context. This suggested that students' intrinsic motivation was more closely associated to proximity than to influence and the associations were stronger in less-CBE than in CBE learning environments.

6. Conclusions and discussion

Competence-based education (CBE) is expected to raise student motivation (Wesselink, 2010) by providing a more challenging, authentic learning and student-centred learning environment (De Bruijn & Leeman, 2011; De Bruijn, 2012; Wesselink et al., 2010). CBE requires different roles for students and teachers, also reflected in CBE design principles (Sturing et al., 2011; Wesselink et al., 2007), compared to more traditional learning environments that mainly focus on knowledge transfer from teacher to student. Different patterns of how students perceive their teachers' interpersonal behaviour in CBE classrooms compared to less-CBE classrooms can be expected and related to increasing students' intrinsic motivation. However, empirical evidence for these expectations is lacking hitherto. This present study attempts to contribute to our understanding of how students from CBE and less-CBE learning environments perceive their teachers' interpersonal behaviour in Indonesian agricultural vocational schools and if these perceptions moderate the connection between competence-based education

Table 6
Associations of QTI Dimensions and IMI subscales: correlation coefficient, Fisher's z and p-value.

Dimension		Intrinsic motivation subscales											
		Interest/enjoyment			Perceived competence			Felt pressure/tension			Value/Usefulness		
		r	z	Sig.	r	z	Sig.	r	z	Sig.	r	z	Sig.
Influence	CBE	0.24[a]	−5.08	0.00	0.09[a]	−3.08	0.00	0.02	–	–	0.28[a]	−0.82	0.41
	Less-CBE	0.42[a]			0.21[a]			−0.04			0.31[a]		
Proximity	CBE	0.51[a]	−6.67	0.00	0.25[a]	−3.04	0.00	−0.42[a]	1.19	0.23	0.31[a]	−1.99	0.04
	Less-CBE	0.68[a]			0.36[a]			−0.38[a]			0.38[a]		

[a] Correlation is significant at the 0.01 level (2-tailed).

and students' intrinsic motivation.

This study has several important findings regarding CBE theory and practice, specifically in the roles of teachers in the Indonesian context. Indonesian vocational agricultural students report the tolerant/authoritative teacher as the most common profile of interpersonal behaviour, both in CBE and less-CBE learning environments. The proximity and influence dimension scores indicated that teachers were perceived as similarly cooperative and dominant. This finding is comparable to previous researches in the Indonesian junior secondary schools context (e.g., Maulana et al., 2012), and other Asian countries (e.g., Walberg, Singh, & Rasher, 1977; Wei et al., 2009).

Regarding the QTI dimensions, the finding showed a difference between the CBE and less-CBE context. With respect to the influence dimension, students in CBE perceived their teachers as more dominant than students in less-CBE. While this finding was somewhat unexpected, when looking at the CBE principles as defined in the Netherlands (Sturing et al., 2011; Wesselink et al., 2007), this was probably because teacher dominant behaviour is more valued in the Indonesian context than in the more western countries that implemented CBE (Wesselink et al., 2007) and the more teacher dominance is believed to lead to better student learning engagement in Indonesia (Maulana et al., 2011). While competence-based education principles argue for more sharing of responsibility between teachers and students in students' learning, this finding is likely to challenge the CBE theory in the Indonesian context.

While some significant differences were found between perceived teacher behaviour in CBE versus less-CBE schools, the teacher profiles overall were comparable. This suggests that, even though competence-based education theory (Sturing et al., 2011; Wesselink et al., 2007) stresses drastic changes in students and teacher roles, and therefore in teacher–student interaction, in CBE compared to traditional education, these drastic changes had not (yet) been seen in the Indonesian context. Or, they were at least not perceived by the vocational education students. This finding can be explained in two ways. CBE probably means something different in the Indonesian context than in the original Dutch context. CBE in Indonesia is more 'initiative from above' (Utomo, 2005, p. 116) meaning that changes in teacher roles were more likely depending on whether or not the regulation gave emphasis on those required changes. It might also be because teachers are simply not (yet) equipped with the behavioural repertoire that belongs to competence-based education (see also De Bruijn & Leeman, 2011). CBE principles might say that "teachers should be more of a coach in the student learning process", this does not mean that teachers understand and are able to actually perform this role. Previous research in the Western countries also shows that implementing the CBE principles in concrete education practice is no sinecure (De Bruijn & Leeman, 2011; Gulikers, Biemans, Wesselink & van de Wel, 2013; Khaled, Gulikers, Biemans, & Mulder, 2014; Wesselink, 2010). Thus, future research and theory on CBE should pay more attention to how teacher roles and interpersonal behaviour should be concretely operationalised in a competence-based classroom.

Moreover, this study supports earlier findings showing that students' perceptions of teacher behaviour are important intermediating variables between teaching or learning environment characteristics and students' learning outcomes (Broks, 2001; Khaled et al., 2014). This present study demonstrates that teacher interpersonal behaviour plays an important role in moderating the effect of a learning environment, either competence-based or less-competence based, on students intrinsic motivation. However, this moderating influence was stronger in the less-CBE context, suggesting that a competence-based learning environment might, as expected, be a more powerful learning environment in itself in stimulating student motivation. However, also in a CBE context, teachers and researchers should be aware of the influential role of teachers and their actual implementation of CBE behaviour in moderating the impact of a learning environment on student outcomes. Therefore, a strong theoretical foundation alone is not enough, as its effect strongly depends on how it is implemented and perceived (e.g., De Bruijn & Leeman, 2011; Gulikers et al., 2013).

This study was subject to limitations. This study mainly focused on investigating teaching from one perspective: an interpersonal quantitative perspective. Future research using different perspectives and/or combined with qualitative data will likely add to our understanding of effective teacher behaviour and its role in competence-based education. A subject-content perspective (Brekelmans et al., 2000; Brok, 2001), for example, might be used to investigate the content of words used in teachers' instructions in classrooms and its effect on enhancing students' learning motivation. Future research should also consider students' preferred teacher interpersonal behaviour in competence-based education. Students might have preferences for a particular teacher's teaching behaviour (e.g., Brekelmans et al., 2000; van Oord & den Brok, 2004) and students who were taught by their preferred teachers will likely to be more motivated than students taught by teachers showing behaviour they did not prefer (Yu & Chen, 2012). A further limitation, the Cronbach's alpha coefficients for some of the eight QTI scales were least satisfactorily indicating they might not measure that scales all that well. Therefore, any associations having to do with that scale should be viewed cautiously and future research need to take this carefully into account to get more reliable findings.

Scientifically, this study examines the extent to which CBE theory and principles designed in a western context transfer to an Indonesian context. Moreover, it adds to the knowledge base on the importance of interpersonal behaviour in relation to students' learning motivation, confirming the previous studies conducted in other learning environments and educational levels. It adds empirical evidence for these relationships in a vocational agricultural context, which has not been the object of a study before.

At a more practical level, this study offers insights for teachers, programme developers and policy makers. It offers food for thought for Indonesian policy makers regarding vocational education and the transition towards competence-based education (Power & Cohen, 2005; Raihani, 2007). When designing professional development activities for vocational teachers, policy makers and programme developers should consider how to improve teachers' abilities to elaborate the roles of the teacher from mainly being a content expert to also being a coach and facilitator of student learning, stimulating students' self-directedness. Teachers should become aware of their interaction with students and how much students can gain from the interaction in terms of motivation and competence development.

As the Indonesian government has recently been focussing on re-establishing the competence-based approach for its latest curriculum reformation (Nuh, 2013), studies on competence-based education that also examine aspects for successful implementation are of great importance and relevance in the current Indonesian context. Countries which are also working on an educational innovation can learn from this study to pay more attention to what type of perceived teacher behaviours are required for supporting the successful implementation of such educational innovations.

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Appendices

Appendix 1. Factor loadings from an exploratory factor analysis of Indonesian QTI.

Scale	Dimension 1	Dimension 2
DC – Leadership	−0.07	0.83
CD – Helping/Friendly	−0.29	0.79
CS – Understanding	−0.09	0.80
SC – Student freedom	0.09	0.30
SO – Uncertain	0.61	−0.20
OS – Dissatisfied	0.86	−0.05
OD – Admonishing	0.84	−0.14
DO – Strict	0.70	0.30
Eigenvalues	2.73	1.88
% of variance	30.16	57.65

Note: The factor loadings in the QTI represents coordinates within the circular structure, so each scale is expected to load in both factors at the same, even though different in magnitude. This is different from from regular factors models, in which scales (items) are expected to display loadings on only one factor (Mainhard, 2009, p. 26).

Appendix 2. Scale inter-correlation for the Indonesian QTI.

Scales	DC	CD	CS	SC	SO	OS	OD	DO
DC – Leadership	1.00							
CD – Helping/Friendly	0.58[a]	1.00						
CS – Understanding	0.52[a]	0.54[a]	1.00					
SC – Student freedom	0.06[a]	0.20[a]	0.18[a]	1.00				
SO – Uncertain	−0.27[a]	−0.22[a]	−0.14[a]	0.15[a]	1.00			
OS – Dissatisfied	−0.10[a]	−0.27[a]	−0.10[a]	0.02	0.44[a]	1.00		
OD – Admonishing	−0.12[a]	−0.34[a]	−0.20[a]	−0.02	0.40[a]	0.65[a]	1.00	
DO – Strict	0.18[a]	−0.03	0.09[a]	−0.01	0.16[a]	0.47[a]	0.45[a]	1.00

[a] Correlation is significant at the 0.01 level (2-tailed).

Appendix 3. Structure Matrix Obtained by PCA After the Varimax Rotation on Items of the Intrinsic Motivation Inventory.

Items	Component 1 'perceived Value/ Usefulness'	Component 2 'interest/enjoyment'	Component 3 'perceived competence'	Component 4 'felt pressure/tension'	Component 5
Useful subject	**0.79**				
Useful for future	**0.77**				
Help to master	**0.75**				
Important subject	**0.74**				
Useful activity	**0.68**				
Meaningful assignment	**0.60**				
Useful for future work	**0.59**				
Valuable assignment	**0.56**				
Enjoyful to follow		**0.76**			
Enjoy the class		**0.73**			
Not boring		**0.63**			
Happy to attend the class		**0.62**			
Interesting subject		**0.58**			
Hold attention		**0.55**			
Did pretty well			**0.76**		
Skilled			**0.74**		
Good at this subject			**0.69**		
Feeling competent			**0.62**		
Satisfied with the results			**0.61**		
Not feeling pressure				**0.75**	
Relax doing assignment				**0.74**	
Not feeling tense				**0.67**	

(*continued on next page*)

(*continued*)

Items	Component 1 'perceived Value/ Usefulness'	Component 2 'interest/enjoyment'	Component 3 'perceived competence'	Component 4 'felt pressure/tension'	Component 5
Can't do well				*−0.55*	
Not taken seriously					*0.79*
Not feeling nervous					*0.57*
Eigenvalues	4.36	3.01	2.80	2.14	1.28
% of variance	17.44	12.05	11.20	8.58	5.12

Note. All loadings >0.40 are depicted; Bold items are used for further analysis, Problematic items are in italic and deleted for further analysis. PCA = principal components analysis.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.tate.2015.04.007.

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