



Validity and Reliability of Cognitive Constructivism-Oriented Teaching Conception Questionnaire

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Abstract

Background As there is a paucity of instrument investigating a hybrid teaching conception, the current study is seen as part of attempt to fill this gap.

Methodology The subjects in the study were 310 University participants–instructors in Socialist Republic of Viet Nam (Vietnam). The survey was implemented with the use of Cognitive Constructivism-oriented Teaching Conception Questionnaire (CCOTCQ), including two scales, namely, teachers’ beliefs and teachers’ intentions of actual practice. Each is inclusive of three factors: Teaching, Teacher, and Students.

Results Exploratory factor analysis was applied to the data and identified three dimensions. The confirmatory factor analysis model was good for both scale of teachers’ beliefs and that of their intention of actual practice. The Pearson correlation analysis found a significant relationship in the results for the scale of teachers’ beliefs and that of their intentions of actual practice.

Keywords Teaching conception · Beliefs · Hybrid · Cognitivist · Constructivist · Validity

Introduction

By using dimensions to code qualitative data, educational researchers arranged their findings regarding teaching conceptions of participants–instructors into two strongly qualitative contrasting subsets, teacher centeredness and student centeredness (Kember, 1997). However, there still remain other findings reflecting a hybrid in the way participants–instructors conceive the nature of teaching that is neither totally teacher-centered nor totally student-centered manner. Because of that, those findings become categories of teaching conception unclassified. Discerning that those unclassified categories have the striking commonalities in revealing participants–instructors’ recognition of the role of classroom interaction in students learning, Kember, (1997) suggested the term conception of *teacher–student interaction* to cover those unclassified categories (Figure 1). Samuelowicz and Bain (2001), however, argued that, along with other beliefs, it is the *purpose and nature* of the interactions that differentiate the categories of teaching conception unclassified from those classified in the two strongly qualitative contrasting subsets. However, here needs a conscious inference that even if Kember’s suggestion of teaching conception of *teacher–student interaction* is not widely accepted, it does not bring any impact upon the existences of categories of teaching conception that have not been unclassified yet as they have been already subsisted as realistically existing entities. To put it more clearly, if the teaching conception of *teacher–student interaction* adequately represents those unclassified categories, the latter becomes the subordinates of the former; otherwise, those already-found categories still remain ungrouped. As the group of teaching conception unclassified is the very reflection of participants–instructors’ idiosyncratic perception and interpretation of many educational artifacts, and as it was identified under

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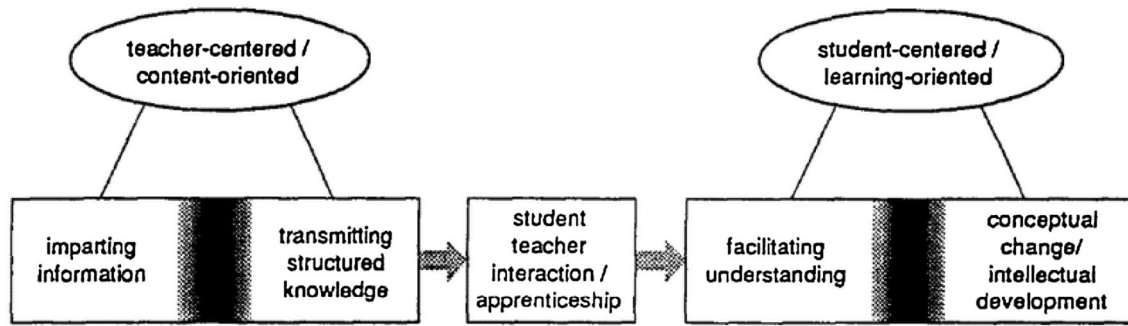


Fig. 1 Multiple-level categorization model of teaching conceptions, Kember (1997)

the employment of second-order research method, the current paper assumes that there still remains another lens under which teaching phenomenon is conceived but it is not investigated in any quantitative studies. Because of that, the current study aims at developing an instrument exclusively used for investigating instructors' teaching conception that stay unclassified in interview based reviewed by Kember, (1997). To achieve this aim, providing evidence of differences regarding the *purpose and nature* of interaction between categories of teaching conception ungrouped and those grouped in the two strongly qualitative contrasting subsets and then constructing dimensions and scales of the instrument are the objectives. The current study deals with the following question: *Is the instrument with the scale of teachers' beliefs and intentions of actual practice reliable for investigating cognitivist-constructivism-oriented teaching conception of Vietnamese instructors?*

Literature Review

Participants–instructors holding unclassified teaching conceptions viewed themselves as tutors interactively and cognitively support their students in transforming textbook's information into relational knowledge, rather than neither learning facilitators nor knowledge transmitters. Specifically, those participants–instructors made efforts into involving students in the evoked ideas and learning activities through which their thinking about disciplinary issues is activated: *"They [the students] talk...I listen... to guide them, not to force something down their throats"* (Kember & Cow, 1994, p. 63). This type of expression implies that participants–instructors might have employed thinking strategies and talking frameworks to enable students use their own language to express themselves, which then help them have a conscious look at their thinking and thoughts. In so doing, students' mental participation can be maximized (Proctor et al., 2020; Schunk, 1991). Those participants–instructors also described their employment of higher-level cognitive types of learning, for example complex

interpretive reasoning activities, to challenge students' mental abilities for bringing about a profound influence on their cognition: *"to think for themselves [students themselves] ...try to get them to interpret before I [participants-instructors] tell them... ask them to predict the result..."* (Trigwell et al., 1994, p. 80). This short-quoted interview visualizes participants–instructors' tension between not encouraging students to take information at face value and informing them (correct) answers. Engaging in interpreting task for generating the prediction corresponds with the time when the students have to coordinate their reasonings with their cognitive process. If such a process fails, then the generation of mental discomfort or disequilibrium seems unavoidable, one of the most crucial components of Piaget's cognitive theory (Piaget, 1968; Till and Sprosser, 2020; Kabir et al., 2021). They valued students' prior knowledge and experience presented in their described effort into assisting their students in elaborating their existing mental structures to the newly introduced new lesson information: *"tie new material with material... in their [students'] brain"* (Trigwell et al., 1994, p. 80); *"relating what they [students] need to know with what...already know"* (Prosser et al., 1994, p. 224). *"... relate the new material to their [students'] previous experiences"* (Dunkin, 1992, p. 448). Relating learners' previous schema to the newly introduced information is the very core principle of learning and teaching rooted in cognitivist and constructivist learning theory (Perry, 1999; Brod et al., 2013; Hattan et al., 2015; Smith, 1978; Lee et al., 2017; Thuy, 2020). When it comes to feedback provision, rather than using feedback as the vehicles of controlling students' learning behaviors and of directing them to the "right" track of teaching process, participants–instructors in the unclassified group employ it as supporters for students' capability to across obstacles in their new cognitive territory (formative evaluation): *"when they [students] make mistakes...discuss...with their demonstrator [participant-academics] ... given lots of opportunities to test their knowledge for themselves"* (Prosser et al., 1994, p. 222). Literature reveals that a Behaviorist uses feedback for modifying students' behavior while a Cognitivist employs feedback to

guide and support their students' mental connections (Ertmer, 2013; Brookhart, 2017; Moss & Brookhart, 2019).

To sum up, the lens under which participants–instructors in the unclassified group of teaching conception view teaching appears to be less transmissive, directive, and oppressive than that of their counterparts in the quantitative subset. Although teaching in both cases is viewed as transferring curriculum-defined knowledge and teachers' understanding of subjects to students present, the former triggered students' cognition through active and mental learning activities while the latter passed textbook's content over them as much as possible. However, the lens under which participants–instructors in the unclassified group view teaching seems not much indirect, cooperative, and facilitative as their counterparts in the qualitative subset did. Kember labeled categories of teaching conception in qualitative subset as student-centered or learning-oriented, deriving from constructivism (Tran et al., 2018; McLeod, 2019; Yao, 2018). Participants–instructors from the qualitative subset view lesson content as vehicles for conveying way of thinking, interpreting, and experiencing from their students' side. In so doing, students' internal representation of knowledge or their previously gained knowledge can interact with the new events surrounding their learning for new knowledge construction. The aforementioned points are well depicted in the quoted interviews: “*Knowledge was to be interrogated, never taken-for-granted.*” (Pratt, 1992, p. 213); “*Confronting students with their preconceived ideas about the subject, which quite often conflict with what we are talking about.*” (Prosser et al., 1994, p. 81). Assisting them in building newly introduced lesson information into their previously gained knowledge, participant-academics holding categories of teaching conception unclassified presumably have direct relevance for their teaching conception drawn from *cognitive sciences*, especially, the works of Piaget, Bruner (Perkins, 1991). For that, the categories of teaching conception in the unclassified group is presumably associated with Cognitivet constructivism. GSI Teaching and Resource Center (2016) claim that “Cognitive constructivism states knowledge is actively constructed by learners based on their existing cognitive structures.... Cognitivist teaching methods ... assist students in assimilating new information to existing knowledge and...make the appropriate modifications to their existing intellectual framework to accommodate that information” (p. 5).

Methodology

Participants

310 University instructors in Vietnam were invited to participate in this methodological study. All of the

participants–instructors met the requirements for being a University instructor as stipulated by Vietnam Ministry of Education and Training. All of the participants–instructors are volunteered to attend to the work. Before administration, all of the participants–instructors were informed that their contribution and participation are as a part of this current research work, then, the research goals and ethical considerations were clarified specifically. They were also being set free in mind with the emphasis that their identification and answers are merely used for research work and would not be divulged to anyone. The participants–instructors got then, thus, encouragement to give responses to the items described in the instrument truthfully.

Instrument

Items are originated from global interview transcripts and principles rooted in learning theories of cognitivist applicable in the field of education, such as Information-Processing Theories, Cognitive Load Theory, Self-Regulated Learning. A 21-item teachers' beliefs questionnaire is on a 5-point Likert scale (1 = in total disagreement; 5 = in total agreement) and a 21-item teachers' intentions of actual practice questionnaire is on a 5-point Likert scale (1 = never; 5 = usually). These items were interleaved to disguise the purpose of the questionnaire. The translation for the trial version was into Vietnamese, and then the comparison for the detection of the remarkable similarities and differences between the newly translated version and the previously composed version is conducted. The translated questionnaire was then altered, modified, and fixed for the best improvement couple of times by several researchers, three teachers of English for the highest level of transparency of the instrument. The translated questionnaire items were assessed carefully on conceptual, semantic, experiential, and operational equivalences. Furthermore, the translated version is again back translated from the Vietnamese version with the supervision of a teacher of Vietnamese Literature. In so doing, another comparison between the latter translated version and the original one can be conducted for their maximum level of transparency and consistency.

Data Analysis Procedures

The statistical analyses of this work were computed using IBM SPSS version 25.0 and Amos software version 26.0. Testing this current study's psychometric properties of three hypothesized dimensions instrument with two scales requires the implementation of several multi-modal analyses (Davidov et al., 2018; Kline, 2016). Specially, the item-based exploratory factor analysis (EFA) with principle component analysis and varimax rotation was performed. Such a procedure of data analysis is expected to yield sufficient

reasoning on which the conclusion regarding if the scale used for investigating participants-respondents' beliefs and that for participants-respondents' intentions of actual practice form the three hypothesized dimensions can be based. The striking commonalities between the performance of EFA in previously implemented work and that in the current investigation is the suggestion for removing some items. In this current work, the 6 eliminated items (3 for each scale) were those that had low loadings on two factors. After having those items eliminated, the same implementation of statistical analysis was re-conducted for the purpose of reducing and cleaning the dataset. The repeated EFA procedure contribute to the identification and elimination of some items which are obscured the interpretation of the latent structure of the developed instrument. For the search of answers to the issue regarding validity of the instruments, multi-modal analyses, namely, divergent, convergent, discriminant, and structural equation modeling were also conducted (Hair et al., 2019).

Findings

For the Teachers' Beliefs Questionnaire

Reliability

The Cronbach alpha(α) and composite reliability (CR) for the dimensions of teachers' beliefs and teachers' intentions of actual practice in this study were computed and the result was as follows: Teaching ($\alpha = 0.79$; 0.81 and CR = 0.79, 0.82); Teacher ($\alpha = 0.94$; 0.90, and CR = 0.94, 0.90); Students ($\alpha = 0.96$, 0.95; and CR = 0.96, 0.95) in the scale of teaching beliefs and that of intentions of actual practice, respectively.

Exploratory Factor Analysis for Teachers' Beliefs Questionnaire

The EFA extracted three dimensions in the questionnaire of teachers' beliefs, namely, Teacher, Students, and Teaching and variance explained in the model were 32.316, 22.9, and 15.74, respectively. Factor 1 had the second highest factor loadings while Factor 2 had the highest factor loadings out of three factors, with its lowest loading even higher than the highest factor loading of Teacher, 0.847 and 0.832, respectively. This seems supporting for the striking commonalities in revealing participants-instructors' recognition of the role of classroom interaction in students learning (Kember, 1997). Factor 3 had the lowest factor loadings out of three factors, with its highest loading even lower than the lowest of an item in Factor 2, 0.767 and 0.847, respectively [see Table 1].

Although only the items with loadings at or above 0.500 were considered for the analysis of the findings, a closer scrutiny of the results revealed that item numbered 1, 2, 3 of Teaching dimension were removed due to poor factor loadings (below 0.40). The employment of robust maximum likelihood for factor extraction and varimax along with Kaiser normalization rotation was conducted. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was moderate for this study (0.906), with 66.90% of the variance explained; Kaiser (1974) recommended the following cut points: excellent = 0.90 and above, very good = 0.80–0.89, acceptable (moderate) = 0.70–0.79, mediocre or average = 0.60–0.69, miserable or inadequate = 0.50–0.59, and unacceptable = 0.50. Data computation extracted three factors with loadings that ranged between 0.678 and 0.914, and Bartlett's test of sphericity was acceptable and significant as well: $\chi^2(153) = 2871.038$, $p < 0.001$, and the eigenvalues for all items exceeded 1.00.

Confirmatory Factor Analysis

The researchers examined the correlated 3 factors models and the goodness of fit of the model examined by GFI, TLI, CFI, and RMSEA. As Table 2 demonstrates the three factors model of teacher beliefs, with $\chi^2(132) = 256.641$, $p < 0.001$, $\chi^2/df = 1.944$, GFI = 0.911, TLI = 0.964, CFI = 0.969, RMSEA = 0.056, 95% CI [0.046, 0.066] [see Fig. 2].

Table 1 Dimensions in teachers' beliefs questionnaire

Factor	Items	Factor loadings
Teachers' beliefs	T05	0.832
	T08	0.812
	T06	0.810
	T07	0.805
	T03	0.731
	T04	0.722
	T02	0.689
	T01	0.689
Students	S02	0.914
	S03	0.904
	S04	0.867
	S05	0.867
	S01	0.847
Teaching	TG04	0.767
	TG05	0.757
	TG06	0.728
	TG07	0.723
	TG08	0.711

T01–T08 Teacher; S01–S05 Students; TG01–TG05 Teaching (source: authors, 2022)

For the Teacher’ Intentions of Actual Practice Questionnaire

Exploratory factor analysis for teachers’ intentions of actual practice questionnaire

The EFA extracted three dimensions in teachers’ intentions, namely, Teacher, Students, and Teaching and variance explained in the model were 24.572, 20.720, and 15.311, respectively. Although only the items with loadings at or above 0.500 were considered for the analysis of the findings, a closer scrutiny of the results revealed that item regarding teaching item numbered 1, 2, 3 were removed due to poor factor loadings (below 0.40). Followed this is the employment of robust maximum likelihood for factor extraction and varimax along with Kaiser normalization rotation. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was moderate for this study (0.865). The total variance

explained was 60.603. Data computation extracted three factors with loadings that ranged between 0.627 and 0.937 [see Table 3], and Bartlett’s test of sphericity was acceptable and significant as well: $\chi^2 (153) = 2375.712, p < 0.001$, and the eigenvalues for all items exceeded 1.00. The result regarding factor loading distribution of the three dimensions in the second scale reveals the striking similarity with that in the first scale. That indicates participants–instructors collectively and comprehensively discern the value of aspects of teaching associating with cognitive constructivist orientation.

Confirmatory Factor Analysis

The researchers examined the correlated 3 factors models and the goodness of fit of the model examined by GFI, TLI, CFI, and RMSEA. As Table 2 demonstrates the three factors model of teachers’ intentions of actual practice, with $\chi^2 (132) = 309.895, p < 0.001, \chi^2/df = 2.35, GFI = 0.900,$

Table 2 Comparison of fit indices in the cognitive-constructivist-oriented conception of teaching for both teachers’ beliefs and intentions of actual practice

No	χ^2 (df)	p value	GFI	CFI	RMSEA (95% CI)
Beliefs	256.641 (132)	0.001	0.911	0.969	0.056, 95% CI [0.046, 0.066]
Intentions	309.895 (132)	0.001	0.900	0.946	.067, 95% CI [0.057, 0.077]

N=310. CFA confirmatory factor analysis; df degree of freedom; CFI comparative fit index, GFI goodness of fit; RMSEA root mean squared error of approximation; χ^2 chi-square

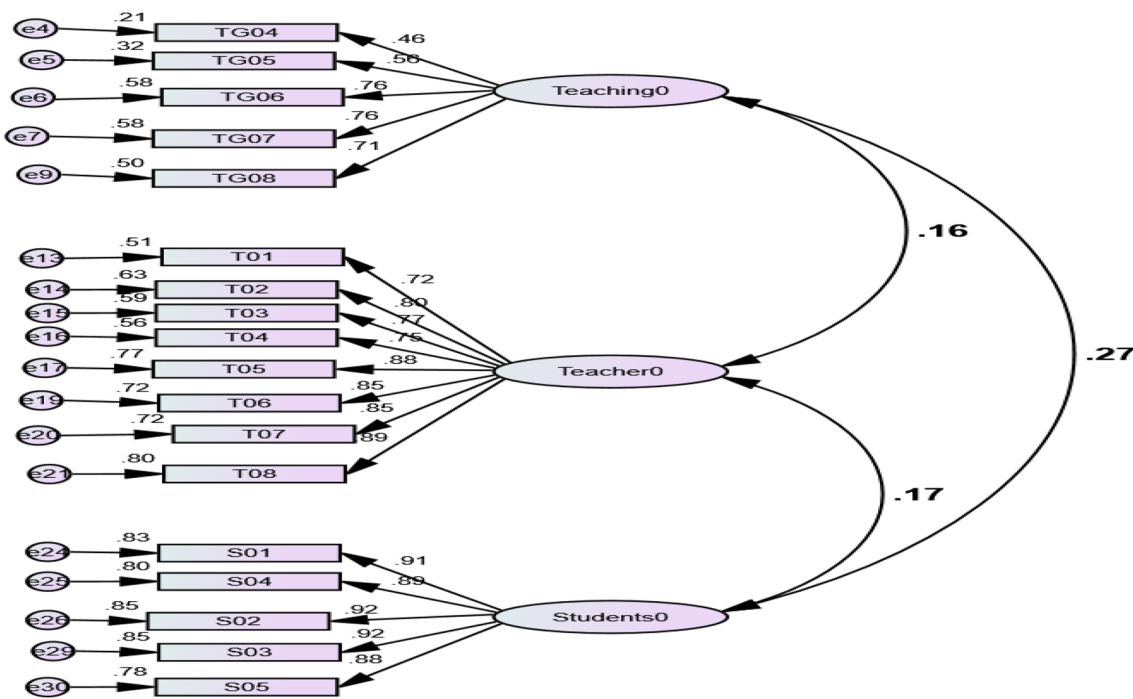


Fig. 2 CFA of teachers’ beliefs questionnaire (authors, 2022)

Table 3 Dimensions of teachers' intentions of actual practice

Factor	Items	Factor loadings
Teachers' intentions of actual practice	T05	0.816
	T08	0.797
	T06	0.635
	T07	0.790
	T03	0.715
	T04	0.712
	T02	0.630
	T01	0.627
	S01	0.755
	S02	0.937
	S03	0.887
	S04	0.860
	S05	0.776
	TC04	0.778
	TC05	0.764
	TC06	0.748
TC07	0.657	
TC08	0.624	

T01–T08 Teacher; S01–S05 Students; TG01–TG05 Teaching (source: authors, 2022)

TLI = 0.938, CFI = 0.946, RMSEA = 0.067, 95% CI [0.057, 0.077] [see Fig. 3].

Validity Indices of Cognitive-Constructivism Oriented Teaching Conception Questionnaire for Teachers' Beliefs and Teachers' Intentions of Actual Practice

The researchers evaluated the validity of teachers' beliefs and intentions of actual practice in multi-dimensions for conception of teaching based on their respective scores in AVE and MSV. First, the constructs were tested since their AVE values were higher than their MSV. Hence, the result of this study indicated that the sub-constructs of the teachers' beliefs AVE were greater than MSV and presented their consecutive result as follows: (a) Teaching (AVE = 0.44 > MSV = 0.07), (b) Teacher (AVE = 0.81 > MSV = 0.03) and c) Students (AVE = 0.82 > MSV = 0.03). Regarding the instrument scale of teachers' intentions of actual practice are as follows: Teaching (AVE = 0.48 > MSV = 0.06), (b) Teacher (AVE = 0.72 > MSV = 0.11) and c) Students (AVE = 0.78 > MSV = 0.11) [see Table 4].

Second, we compare the AVE with squared inter-item correlations within the construct [see Table 4] to assess discriminant validity to see whether the AVE is higher than squared correlations (Hair et al., 2019). Thus, based on the suggested criteria, AVE is higher for two out of three constructs in this study than the squared correlation of all construct, which suggests that each factor's variance is better

explained by the corresponding items that mainly load on each factor.

Third, to demonstrate the convergent validity of the constructs of teachers' beliefs, the researchers tested its association with other relevant constructs (teachers' intentions of actual practice). The result revealed that the three constructs such as Teacher, Students, and Teaching of questionnaire used for investigating teachers' beliefs have a statistically and positively significant relationship with those of that for teachers' intentions of actual practice. Regarding the inter-relation among the three constructs of teachers' beliefs questionnaire, there existed a statistically and positively significant relationship with Teacher and Students with 0.160^{**} , $*p < 0.05$. $**p < 0.01$, respectively. In addition, the statistical and positive relationship between Teacher and Teaching was acknowledged, with $r = 0.112$, $*p < 0.05$. $**p < 0.01$ in succession. The data also revealed the statistical and positive correlation between Students and Teaching, with $r = 0.220^{**}$, $*p < 0.05$. $**p < 0.01$, respectively. When it comes to the connection among the three constructs of the teachers' intentions of actual practice questionnaire, it is indicated that the remains a relationship of statistical and positive significance between Students and Teacher, with $r = 0.317^{**}$, $*p < 0.05$. $**p < 0.01$, respectively. Furthermore, the statistical and positive correlation between Teacher and Teaching was admitted, with $r = 0.195^{***}$, $*p < 0.05$. $**p < 0.01$ in succession. Also to be considered is the manifestation of the relationship between Students and Teaching which was statistically and positively significant, with $r = 0.141^*$, $*p < 0.05$. $**p < 0.01$, respectively [see Table 5]. The factor of Teaching in both scales convergent validity is not good (AVE < 0.05). That is brought by the fact that being dominated more than ten decades by the Confucians philosophy, Vietnamese teachers at all levels of education are familiar with the notion that teachers always know more than the students. They have more experiences in life and education and that make any of their decision regarding teaching and educating wise as a result, despite of starting to discern the role of interacting with the students in assisting them in being capable of constructing the relational knowledge themselves, participants–instructors still are not completely escaped from the notion of oppressive teaching.

Discussion

The instrument in this current study differs itself with those in use in the structure of the scale. Specially, the newly developed instrument is inclusive of the two scales, one scale being used for investigating teachers' belief as conception is belief driven (Clark & Peterson, 1986; Dejene, 2020; Ngan et al., 2021) and the other for teachers' intentions of actual practice (Pratt, 1992; Loi, 2020), while the previously

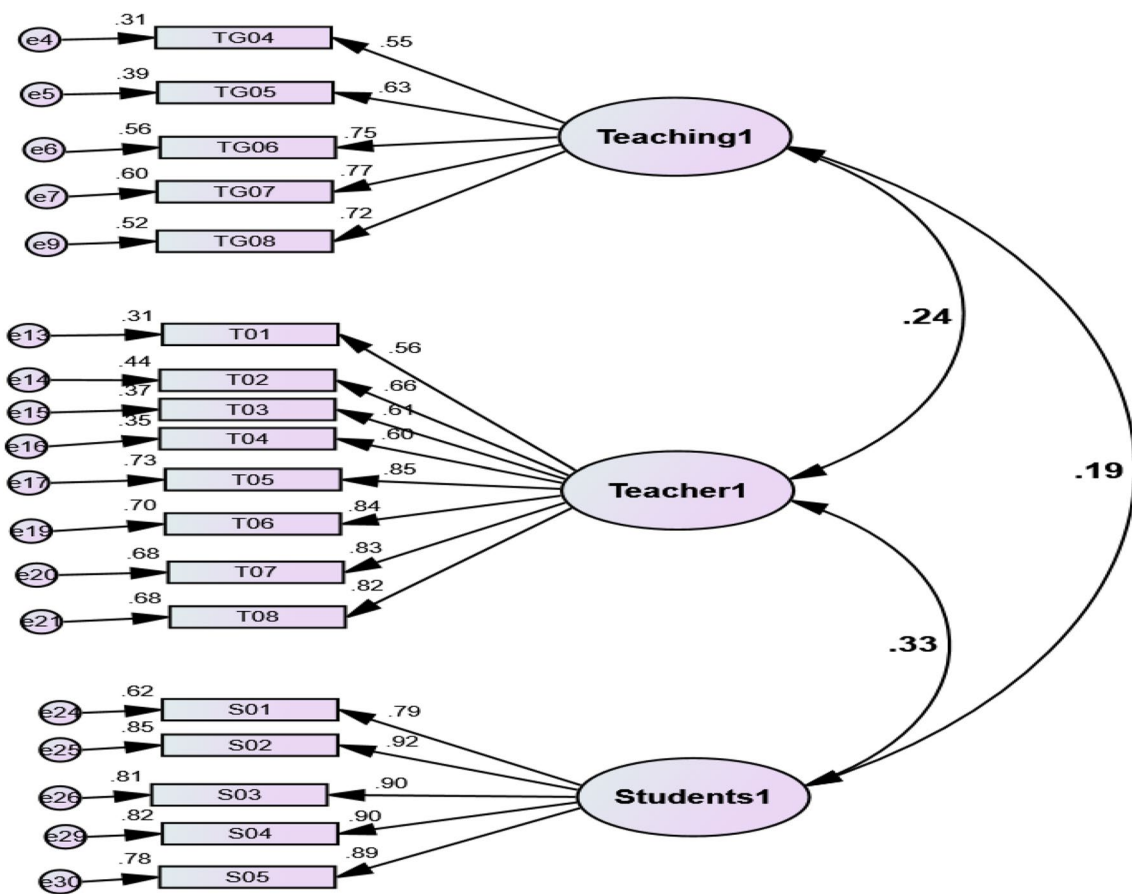


Fig. 3 CFA of teachers' intentions of actual practice questionnaire (authors, 2022)

conducted instruments were merely inclusive of the former (Gow and Kember, 1994; Chan and Elliot, 2004). Such a difference is worth generating as Marton, (1988) describes a phenomenography as “a research specialization to study the different understandings or conceptions of phenomena in the world around us” (Trigwell et al., 1994, p. 76); Phenomenographic procedures involve the discovery of a range of qualitatively different categories of conceptualization which are described as relational. Furthermore, long ago, Pratt (1992) argued that teacher teaching conception are assumed to be formed of a dynamic and interdependent trilogy of Actions, Intentions, and Beliefs and that in combination, these aspects are considered to be more meaningful than when being separated. To Pratt, what the teacher believes informs his intentions and then govern his process of teaching, from which teachers' insightful understanding of what they think about teaching can be uncovered (Canbay & Beceren, 2012; Feixas & Euler, 2013). Therefore, learning about teachers' intention of actual practice helps capture sufficiently and adequately instructors' comprehension/understanding of that which teaching phenomenon is thought about. In the specific context of math education,

Wilson and Cooney (2002) argued that from the learning of teachers' articulated intentions of practice, insightful view into what math instructor value and the relative importance they assign to different aspects of the nature of teaching of mathematics can be captured significantly.

The instrument contributes a small part of attempt to the success of educational reform in Vietnam and perhaps some wider contexts. Decades ago, it was cautioned that teachers' beliefs constituted one of the strong forces that restricted the impact of educational reforms, and that has led to a boom of research on teacher cognition in an attempt to unveil the hidden side of teachers, for the purpose of offering intervention for teacher education and development (Borg, 2006). As Vietnam is the nation with culture orientation toward the collectivism and has the typical socio-economic, cultural, educational features of a developing country. For the success of educational reform, locating where teachers currently is on the continuum from behaviorist to cognitivist and constructivist is prerequisite. From that, more interventions can be made for the generation of the sufficient conditions. With such a progress, if much effort can be made into helping the teachers perceive the usefulness of the student-centered

Table 4 Validity indices of the scale of the cognitivist-constructivism-oriented conception of teaching instrument

No	Models	CR (> .70*)	AVE (> .50*)	MSV	Squared correlation		
					Teaching	Teacher	Students
Teachers' beliefs							
1	Teaching	0.79	0.44	0.07	1		
2	Teacher	0.94	0.81	0.03	0.03	1	
3	Students	0.96	0.82	0.03	0.07	0.03	1
Teachers' intentions of actual practice							
1	Teaching	0.82	0.48	0.06	1		
2	Teacher	0.90	0.72	0.11	0.06	1	
3	Students	0.95	0.78	0.11	0.04	0.11	1

education, the teachers' willingness toward implementing and changing is more likely to be pertained. This seems still hold true in the domain-specific teaching, especially the language teaching and learning in Vietnam. The instrument can be applied for the detection if the language teachers discern the role of classroom interaction in students learning. This aspect should be viewed as the positive signal for language teaching development (Idris et al., 2022). Many decades ago, literature documented the theoretical, pedagogical, and empirical evidence of the role of teacher–student interaction in facilitating second language learners learning (Long, 1996 cited in Nguyen, 2020; Swain, 1995). Therefore, using the instrument to investigate if the language teachers show any signal of the breath of their awareness for the aspect of interaction in language teaching phenomenon. Then, intervention can be accordingly adopted for upgrading their teaching with task-based aspects.

The instrument in this study can also be applicable in other aspects of teaching such as teacher educator or teacher trainer for pedagogical development program. Specially, for the former, the instrument would be for examining the inter-relationships between the scales with the instruments intended for investigating teaching conception with features of total teacher centeredness and total students centeredness. The rationale for this use is that because transitory is the hybrid. For the latter, the instrument may be used in a repeated measure design to determine the effect of a certain professional development program. Working or students teachers are asked to complete the instrument shortly after the start of a training program, reporting their normal conception and perception about teaching phenomenon prior to the course. When the training period nearly comes to an end, and possibly at intermediate points for longer courses, those teachers again are requested to conduct the questionnaire. For this time, the changes or the stability in teacher perception of teaching can be reported.

Conclusion

The results of the EFA suggested that Vietnamese instructors holding transitory teaching conception incorporate three dimensions, Teaching, Teacher, and Student. The results of the EFA support Kember's argument regarding the commonality between categories of teaching conceptions unclassified in teachers' recognition of the role of classroom interaction for students learning. This could be seen as a positive signal for the progress of educational reform in Vietnam, although it is still slow compared to the reform in other developing countries. As the control continuum goes along a spectrum, starting from transmitting knowledge to triggering problem-solving ability and student–teacher interaction within the defined curriculum (i.e., transaction), to students'

Table 5 Pearson correlations of teachers' beliefs and intentions of actual practice scores and related measures

Variables	Beliefs			Intentions of actual practice		
	Teacher	Students	Teaching	Teacher	Students	Teaching
Teacher	1			1		
Students	0.160**	1		0.317**	1	
Teaching	0.112	0.220**	1	0.195**	0.141*	1

* $p < .05$. ** $p < .01$

self-directed learning (i.e., transformation) (Metzler, 2011), more support regarding the satisfaction of the three basic psychological needs such as the need of autonomy, competence, and relatedness should be given to teachers of all fields, especially language teacher to boost their process of reforming. Working in supportive environment enable teachers can have more competence and freedom in engagement of student-centered implementation. This is of crucial as when they get motivated intrinsically in changing, students can also have chance to alter their studying approach. As CFA did not reject the proposed issue of teaching conception as measured by the CCOTCQ and as Pearson correlation analysis revealed significant relations between dimensions from questionnaire of teachers' beliefs and that of intention, which is one of the reasons making the current instrument different from the existing, not only the instrument is valid for measuring Vietnamese instructors' Cognitive Constructivism-oriented conception of teaching, but it also be applicable in other aspects of teaching such as teacher educator or teacher trainer for pedagogical development program.

This current work is hoped to make small contribution to the process of implementing educational reform in Vietnam context and hopefully perhaps more widely. The study highlights itself in the way that it is as a part of an attempt to bridge the gap of the previously developed instruments that merely yield investigating result regarding teachers' teaching conception within the two widely recognized nexus, and that it is as another part of attempt to complete the quantitative tool with sufficient variables of teaching conception exclusively used for instructors in Higher Education.

Limitations and Recommendation

Although CCOTCQ is found to have adequate validity and reliability in the Vietnam context, it also has limitations. In the first place, the sample of this current study is quite small. This study collected data only among academics at three Vietnamese universities; hence, the results cannot be generalized to the whole country. In the second place, the construct of the questionnaire should be examined in other several contexts, including the demographics of the parental status of respondents. Several recommendations for the future studies are also dissed provided. In the first

place, further piloting of CCOTCQ should be conducted in a domain-specific context, language teaching and learning in Vietnam. English is a subject language and seen as the indispensable tool for the success of educational reform. Validating CCOTCQ with the participation of the language teacher help figure out if the analysis for the transformation from traditional to constructivist teaching orientation is already secreted. From that practical intervention can be made and adjust accordingly to their current conception of language teaching approach. In the second place, further studies should also deal with the other remaining factor of Pratt's trilogy, called the action, to capture teachers' working rather than ideal teaching conception. In the third place, further work should be conducted for the study if there is any inter-relation between the cognitivist-constructivism-oriented teaching conception of the instructors to their epistemological beliefs.

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Declarations

Conflict of interest The author(s) have stated no potential conflict of interest.

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References

- Borg, S. (2006). *Teacher cognition and language education*. Continuum.
- Brod, G., Werkle-Bergner, M., & Shing, Y. L. (2013). The influence of prior knowledge on memory: A developmental cognitive neuroscience perspective. *Frontiers in Behavioral Neuroscience*. <https://doi.org/10.3389/fnbeh.2013.00139>
- Brookhart, S. M. (2017). How to give effective feedback to your students. ASCD. <https://eric.ed.gov/?id=ED509138>
- Canbay, O., & Beceren, S. (2012). Conceptions of teaching held by the instructors in English language teaching departments. *Turkish Online Journal of Qualitative Inquiry*, 3(3), 71–79.
- Chan, K., & Elliot, R. (2004). Relational analysis of personal epistemology and conceptions about teaching and learning. *Teaching and Teacher Education*, 20(8), 817–831. <https://doi.org/10.1016/j.tate.2004.09.002>
- Clark, C. M., & Peterson, P. L. (1986). Teachers' thought process. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 255–296). Macmillan.
- Davidov, E., Schmidt, P., Billiet, J., & Meuleman, B. (2018). Cross-cultural analysis methods and applications. *Taylor and Francis Group*. <https://doi.org/10.4324/9781315537078>
- Dejene, W. (2020). Conceptions of teaching & learning and teaching approach preference: Their change through preservice teacher education program. *Cogent Education*. <https://doi.org/10.1080/2331186X.2020.1833812>
- Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly*, 26(2), 43–71.
- Feixas, M., & Euler, D. (2013). Academics as teachers: New approaches to teaching and learning and implications for professional development programmes. *International HETL Review*, 2(12). <http://www.hetl.org/feature-articles/academics-as-teachers-newapproaches-to-teaching-and-learning>
- Hair, J., Black, W., Babin, B., & Anderson, R. (2019). *Multivariate data analysis*. Annabel Ainscow.
- Hattan, et al. (2015). Prior knowledge activation in design and in practice literacy research: Theory. *Method and Practice*, 64(1), 478–497. <https://doi.org/10.1177/2381336915617603>
- Idris, N., Isa, H. M., Zakaria, N. N. N., Taib, N. A. M., Ismail, S., & Rahmat, N. H. (2022). An investigation of the use of cognitive and metacognitive strategies in Foreign language learning. *International Journal of Academic Research in Business and Social Sciences*. <https://doi.org/10.6007/IJARBS/v12-i2/12152>
- Kabir, K. H., Aurko, S. Y., & Rahman, M. S. (2021). Smart power management in OIC Countries: A critical overview using SWOT-AHP and Hybrid MCDM analysis. *Energies*, 2, 14–18. <https://doi.org/10.3390/en14206480>
- Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction*, 7, 255–275. [https://doi.org/10.1016/S0959-4752\(96\)00028-X](https://doi.org/10.1016/S0959-4752(96)00028-X)
- Kember, D., & Gow, L. (1994). Orientations to teaching and their effect on the quality of student learning. *Journal of Higher Education*, 65(1), 58–74. <https://doi.org/10.2307/2943877>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling*. The Guilford Press.
- Long, M. H. (1996). The role of linguistic environment in second language acquisition. In W. Ritchie & T. J. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–468). Academic Press.
- Marton, F. (1988). Phenomenography - A research approach to investigating different understandings of reality. *Journal of Thought*, 21(1), 28–49.
- McLeod, S. A. (2019). *Constructivism as a theory for teaching and learning*. Simply Psychology. www.simplypsychology.org/constructivism.html
- Moss, C. M., & Brookhart, S. M. (2019). *Advancing formative assessment in every classroom: a guide for instructional leaders*. ASCD.
- Ngan, D. T. N., Hercz, M., & Thong, N. V. (2021). Teachers' Professional Knowledge and their Professional Identity If they Relate or not? *International Journal of Childhood Education*. <https://doi.org/10.33422/ijce.v2i4.93>
- Nguyen, L. (2020). A Case Study of Vietnamese EFL Teachers' Conception of Language Output and Interaction. *Journal of Language and Education*. <https://doi.org/10.17323/jle.2020.9777>
- Perry, W. G. (1999). *Forms of ethical and intellectual development in the college years*. Jossey-Bass Publishers.
- Piaget, Jean (1968). *Six Psychological Studies*. Anita Tenzer (Trans.), New York: Vintage Books.
- Pratt, D. D. (1992). Conceptions of teaching. *Adult Education Quarterly*, 42(4), 203–220. <https://doi.org/10.1177/074171369204200401>
- Proctor, K. R., Niemeyer, R. E., & Delisi, M. (2020). Retrofitting social learning theory with contemporary understandings of learning and memory derived from cognitive psychology and neuroscience. *Journal of Criminal Justice*, 4, 66–68. <https://doi.org/10.1016/j.jcrimjus.2019.101655>
- Prosser, M., Trigwell, K., & Taylor, P. H. (1994). A phenomenographic study of academics' conceptions of science learning and teaching. *Learning and Instruction*, 4, 217–231. [https://doi.org/10.1016/0959-4752\(94\)90024-8](https://doi.org/10.1016/0959-4752(94)90024-8)
- Samuelowicz, K., & Bain, J. (2001). Revisiting academics' beliefs about teaching and learning. *Higher Education*, 41(3), 299–325. <https://doi.org/10.1023/A:1004130031247>
- Schunk, D. H. (1991). *Learning theories: An educational perspective*. Macmillan Publishing Co Inc.
- Smith, S. M., Glenberg, A., & Bjork, R. A. (1978). Environmental context and human memory. *Memory and Cognition*, 6(4), 342–353. <https://doi.org/10.3758/BF03197465>
- Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics* (pp. 125–144). Oxford University Press.
- Thi, T., & Tran, T. (2020). Key components of teaching from students' perspectives—Some positive shifts in Vietnamese higher education. *Journal of Further and Higher Education*. <https://doi.org/10.1080/0309877X.2020.1847259>
- Till, C., & Sproesser, U. (2020). Frequency formats: How primary school stochastics profits from cognitive psychology. *Front. Edu.*, 5, 73. <https://doi.org/10.3389/feduc.2020.00073>
- Tran, L. H. N., Phan, T. N. P., & Tran, L. K. H. (2018). Implementing the student-centred teaching approach in Vietnamese universities: the influence of leadership and management practices on teacher engagement. *Educational Studies*. <https://doi.org/10.1080/03055698.2018.1555453>
- Trigwell, K., Prosser, M., & Taylor, P. (1994). Qualitative differences in approaches to teaching first year university science. *Higher Education*, 27, 75–84. <https://doi.org/10.1007/BF01383761>
- Wilson, S., & Cooney, T. (2002). Mathematics teacher change and development: The role of beliefs. In G. C. Leder, E. Pehkonen, & G. Törner (Eds.), *Beliefs: A Hidden Variable in Mathematics Education?* (pp. 127–147). Springer.
- Yao, C. W., & Collins, C. (2018). Student-centered learning at a vietnamese transnational university perspectives from vietnamese graduate students. *Journal of Further and Higher Education*, 43(7), 959–974. <https://doi.org/10.1080/0309877X.2018.1429583>

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