

Effects of Interaction in Teacher Professional Community on Teachers' Innovational Instruction

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ABSTRACT Modern changes of low birthrate have induced the dilemma and competition in the educational environment. To keep up with the knowledge and technology explosion, teachers, with the responsibilities of teaching the fundamental relationship between oneself and the society, telling the knowledge and skills for careers, and helping answer questions in the learning process, cannot fall behind the trend of knowledge and technology. The continuous professional development to enhance the role function would not be reduced with time that the establishment of teacher communities would assist in the professional development and actually benefit the members in professional communities, the served objects, and the public. Total 200 copies of questionnaires are distributed to the instructors in ten public and private universities in southern Taiwan. Total 124 valid copies are retrieved, with the retrieval rate 62%. The research analyses show 1. significantly positive correlations between Interaction in Teacher Professional Community and Innovative Approach in Innovational Instruction, 2. remarkably positive correlations between Interaction in Teacher Professional Community and Innovative Teaching Materials in Innovational Instruction, 3. partially positive correlations between Interaction in Teacher Professional Community and Innovative Environment in Innovational Instruction, and, 4. notably partial effects of Teachers' Background on the correlations between Interaction in Teacher Professional Community and Innovational Instruction.

INTRODUCTION

College instructors are responsible for taking care of and educating the future masters of a country that the work performance would directly impact the students' lifelong learning and healthy physical and mental development (Lee and Chen 2009). Nevertheless, how to educate such masters relies on the deliberate plans and innovative instruction of college instructors. Especially, Innovational Instruction cannot be neglected in face of the emergence of knowledge technology. Instructors therefore should pay attention to new ideas, active innovative instruction, renew teaching materials and approaches, and utilize advance information technology for

ensuring the teaching capabilities and inducing the students' learning interests so as to present the teaching effects (Wu 2012; Sun and Chou 2011; Chu 2010). Wu and Lee (1999) indicated that teachers designed different teaching strategies and approaches to cope with various students and curriculums in the complex teaching environment, but there was not a successful theory applicable to various environments.

Changes and developments occurring in the world in individual, social and economic areas are supposed to be reflected into educational systems and programs (Yadigar 2013). Taking a broad view of the dilemma and competition in the educational environment resulted from low birthrate, how do college instructors apply resources to assist in the innovative instruction, in addition to continuing the professional competence to enhance the professional capabilities? Yang (2009) suggested that teachers with similar interests could gather, interact, and brainstorm for more professional competence and psycho-

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logical energy so as to continue the professional development for more creative transformation. In other words, participating in teacher communities could assist teachers in breaking through the isolated situation and learning with peers to continue the professional development and promote the innovative instruction. When the community members share strong community identity, they would be more willing to share information and resources to enhance the mutual aid and learning, increase the mutual support among the members, and present the same belief in the common objectives and satisfaction with the group efforts (Deschamps and Devos 1998; Hatch and Schultz 1997).

Literature Discussion and Definition

Interaction in Teacher Professional Community

Moate (2011) considered that a group with consistent opinions among teachers was necessary for an innovative teacher professional community so as to enrich and broaden the teachers' instruction; besides, active teachers presented affirmative and valuable responses and interaction with the communities in comparison with isolated ones.

Wenger et al. (2002) pointed out the factors in Interaction in Teacher Professional Community as knowledge domains in certain issues, communities of people interested in such domains, and common practice for more efficient development in such domains. The domains indicated the focused subjects of the communities, where developing, sharing, and maintaining specific knowledge was the practice. Yang (2009) regarded teacher communities as a group of teachers with mutual support, reliability, and concern, who presented consensus and would like to share, dialogue, discuss, learn, and reflect the professional knowledge in common rules and places to further construct innovative thoughts. Wang (2010) considered teacher Communities as school teachers grouping for discussions and learning to enhance the professional competence, promising to follow the group rules, and sharing the concepts and value. Wu and Lin (2010) defined Professional Learning Community as a group of colleagues with same interests establishing the learning team for professional development.

Referring to Little (2002), Interaction in Teacher Professional Community in this study covers the following dimensions.

1. Mental Facet, containing Creative Thinking and Critical Introspection When a teacher presents high motivation, intention, and ability to precede learning, creation, and critical introspection with peers, the person is ready for participating in a professional learning community.
2. Project Method-divided into Teaching and Learning. The participating teachers should apply Learner-centered and Action Research teaching approaches as well as a self-directed autonomic learner in context-based situations.
3. Mature Environment-Teachers should share, assist, supervise, and transform in the interaction to achieve the final goal of Self-Assisted Development.

Innovational Instruction

Tidd et al. (2001) defined innovation as enterprises re-designed or improved the products, services, or processes. Chang (2010) mentioned that innovation was a continuous process, rather than an instant solution, with the innovative range covering strategies, talent asset integration, culture reconstruction, technology R and D, organization reorganization, and management system establishment. According to the definition of ERIC Thesaurus, Innovational Instruction refers to the introduction of new teaching concepts, approaches, or tools (Lin 2009). Slimpicio (2000) regarded Innovational Instruction as a trend that teachers not keeping up with the global changes and challenging the self-instruction would be abandoned in the flood. Mirah and Teresa (2001) also pointed out innovative and creative teachers as the ones required for future students. Lin et al. (2010) considered that teachers with creative instruction could cultivate the students to be creative talents.

Wang (2010) regarded teachers' innovative teaching behaviors as teachers coming up with novel and unique ideas, encouraging the participation of others, and promoting and applying effective resources to apply the innovative behaviors to the actual teaching situations. Kuo (2011) emphasized Instructional Innovation by regarding the students as the teaching subjects, focusing on the independence and individuali-

ty, creating open learning atmosphere, and allowing the students randomly thinking in the free, open, acceptable, and warm atmosphere so as to induce new inspiration and create new knowledge. Lo (2010) indicated that creative instruction depending on a teacher developing and practicing creativities in the actual instruction.

Referring to the teaching strategies for Innovative Instruction proposed by Wu and Yang (2011), the following dimensions are covered.

1. Innovative Approach includes diverse interaction between teacher and students, diverse interaction among peers, and team teaching.
2. Innovative Teaching Materials contain equipment and facilities, self-designed teaching materials, and purchased teaching materials.
3. Innovative Environment refers to virtual reality, indoor reality, and outdoor reality.

RESEARCH HYPOTHESES AND METHODOLOGY

Research on Interaction in Teacher Professional Community and Innovative Instruction

Lin (2009) mentioned that the more opportunities to participate in Teacher Professional Communities could enhance individual creative instruction. Tokumasu (2007) indicated that newly recruited teachers considered being an experienced teacher after acquiring specific technologies and knowledge that interacting with other teachers was essential, as participating in Interaction in Teacher Professional Community covered the learning concepts of individual performance and community achievement. Ting (2011) proposed that a teacher's perception and identity to the teaching professional community could appear theoretical and practical dialogues through formal and informal activities and emotional contact and the share of teaching experiences to enhance the teaching effectiveness through innovative teaching skills. Lo (2011) pointed out the significant differences between school location, teacher's academic background, position, teacher learning community and the innovative instruction performance. Chen (2011) also discovered that kindergarten teachers' instructional innovation revealed notable differences on Age, Specialized Background, Number

of classes, and Seniority, but not on identity and highest education; besides, the professional development and the instructional innovation showed positive correlations.

Aiming at the above inference, the following hypotheses are proposed in this study.

H1: Interaction in Teacher Professional Community presents significantly positive correlations with Innovative Approach in Innovative Instruction.

H2: Interaction in Teacher Professional Community shows remarkably positive correlations with Innovative Teaching Materials in Innovative Instruction.

H3: Interaction in Teacher Professional Community reveals notably positive correlations with Innovative Environment in Innovative Instruction.

H4: Gender appears significant moderating effects on the correlations between Interaction in Teacher Professional Community and Innovative Instruction.

H5: Age shows remarkable moderating effects on the correlations between Interaction in Teacher Professional Community and Innovative Instruction.

H6: Seniority reveals notable moderating effects on the correlations between Interaction in Teacher Professional Community and Innovative Instruction.

H7: Specialized Background appears remarkable moderating effects on the correlations between Interaction in Teacher Professional Community and Innovative Instruction.

H8: Number of classes presents notable moderating effects on the correlations between Interaction in Teacher Professional Community and Innovative Instruction.

Research Framework

According to the above research hypotheses, the research framework is drawn (Fig. 1) to

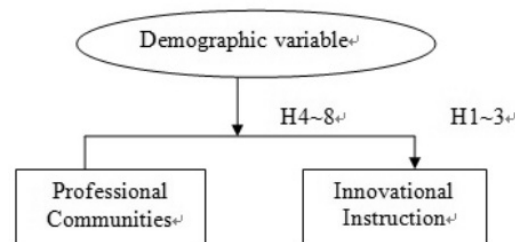


Fig. 1. Research framework

discuss the relations among demographic variables, Interaction in Teacher Professional Community, and Innovational Instruction.

Sample Analysis

The instructors in ten public and private universities in southern Taiwan are selected as the research samples, including Chang Jung Christian University, Kun Shan University, National Sun Yat-sen University, National Kaohsiung First University of Science and Technology, Shu-Te University, I-Shou University, National Cheng Kung University, National Kaohsiung University of Applied Sciences, National University of Kaohsiung University, and National Chung Cheng University.

Total 200 copies of questionnaire are distributed. Having deducted invalid and incomplete ones, 124 valid copies are retrieved, with the retrieval rate 62%. SPSS is utilized for data analyses, where Factor Analysis, Reliability Analysis, Regression Analysis, and Analysis of Variance are applied to testing the hypotheses.

RESULTS AND DISCUSSION

Factor Analysis of Interaction in Teacher Professional Community

Based on the dimensions and questions for Interaction in Teacher Professional Community proposed by Little (2002), three dimensions were acquired with Factor Analysis, and the Cronbach α reliability showed 0.81 (Mental Facet), 0.83 (Project Method), and 0.80 (Mature Environ-

ment). With Principal Component Analysis, the variance explained appeared 81.557% after the oblique rotation.

Referring to the dimensions and questions for Innovational Instruction proposed by Wu and yang (2011), three dimensions were acquired with Factor Analysis, and the Cronbach α reliability presented 0.82 (Innovative Approach), 0.85 (Innovative Teaching Materials), and 0.88 (Innovative Environment). With Principal Component Analysis, the variance explained revealed 83.726% after the oblique rotation.

Correlation Analysis of Interaction in Teacher Professional Community and Innovational Instruction

(1) Correlation Analysis of Interaction in Teacher Professional Community and Innovative Approach in Innovational Instruction

With Regression Analysis to test H1, Table 1, the results showed the notable effects of Mental Facet ($\beta=0.233$, $p=0.000$), Project Method ($\beta=0.251$, $p=0.000$), and Mature Environment ($\beta=0.157$, $p=0.043$) on Innovative Approach that H1 was supported.

(2) Correlation Analysis of Interaction in Teacher Professional Community and Innovative Teaching Materials in Innovational Instruction

With Regression Analysis to test H2, Table 1, the results revealed the significant effects of

Table 1: Regression analysis of interaction in teacher professional community and innovational instruction

Dependent variable → Independent ↓ variable	Innovational instruction					
	Innovational approach		Innovative teaching material		Innovative environment	
	Beta	$\tilde{n}$	Beta	$\tilde{n}$	Beta	$\tilde{n}$
Interaction in teacher professional community						
Mental facet	0.233	0.000	0.216	0.000	0.142	0.068
Project method	0.251	0.000	0.243	0.000	0.188	0.020
Mature environment	0.157	0.043	0.164	0.034	0.088	0.276
F	23.714	28.353	33.815			
Significance	0.000***	0.000***	0.000***			
R2	0.218	0.262	0.314			
Adjusted R2	0.032	0.042	0.051			

Note: * stands for $p<0.05$, ** for $p<0.01$.

Data source: Self-organized in this study

Mental Facet ($\beta=0.216$, $p=0.000$), Project Method ($\beta=0.243$, $p=0.000$), and Mature Environment ($\beta=0.164$, $p=0.034$) on Innovative Teaching Materials that H2 was supported.

(3) Correlation Analysis of Interaction in Teacher Professional Community and Innovative Environment in Innovational Instruction

With Regression Analysis to test H3, Table 1, the results appeared the remarkable effects of Project Method ($\beta=0.188$, $p=0.020$) on Innovative Environment that H3 was partially supported.

Moderating Effects of Demographic Variables

Moderating Effects of Gender on the Correlations between Interaction in Teacher Professional Community and Innovational Instruction

The empirical results of Analysis of Variance, Table 2, showed the significant moderating effects of Gender on the correlations between Mental Facet ($p=0.015$), Project Method ($p=0.002$) and Innovative Approach, between Mental Facet ($p=0.032$), Mature Environment ($p=0.041$) and Innovative Teaching Materials, and between Project Method ($p=0.026$) and Innovative Environment that H4 was partially supported.

Moderating Effects of Age on the Correlations between Interaction in Teacher Professional Community and Innovational Instruction

The empirical results of Analysis of Variance, Table 2, presented the remarkable moderating effects of Age on the correlations between Mental Facet ($p=0.023$), Mature Environment ($p=0.013$) and Innovative Approach, between Project Method ($p=0.000$), Mature Environment ($p=0.046$) and Innovative Teaching Materials, and between Mental Facet ($p=0.033$), Project Method ($p=0.042$) and Innovative Environment that H5 was partially supported.

Moderating Effects of Seniority on the Correlations between Interaction in Teacher Professional Community and Innovational Instruction

The empirical results of Analysis of Variance, Table 2, appeared notable moderating effects of Seniority on the correlations between Mature Environment ($p=0.037$) and Innovative Approach, between Project Method ($p=0.028$), Mature Environment ($p=0.017$) and Innovative Teaching Materials, and between Project Method ($p=0.021$), Mature Environment ($p=0.000$) and Innovative Environment that H6 was partially supported.

Moderating Effects of Specialized Background on the Correlations between Interaction in Teacher Professional Community and Innovational Instruction

The empirical results of Analysis of Variance, Table 2, revealed the significant moderating ef-

Table 2: Moderating effects of demographic variables on the correlations between interaction in teacher professional community and innovational instruction

<i>Demographic variable</i>	<i>Interaction in teacher professional community</i>	<i>Innovative approach</i>	<i>Innovative teaching materials</i>	<i>Innovative environment</i>
<i>Gender</i>	Mental facet	P=0.015	P=0.032	P=0.622
	Project method	P=0.002	P=0.203	P=0.026
	Mature Environment	P=0.342	P=0.041	P=0.151
<i>Age</i>	Mental facet	P=0.023	P=0.073	P=0.033
	Project method	P=0.242	P=0.000	P=0.042
	Mature Environment	P=0.013	P=0.046	P=0.811
<i>Seniority</i>	Mental facet	P=0.137	P=0.028	P=0.334
	Project method	P=0.117	P=0.017	P=0.021
	Mature Environment	P=0.037	P=0.496	P=0.000
<i>Specialized Background</i>	Mental facet	P=0.011	P=0.371	P=0.276
	Project method	P=0.357	P=0.000	P=0.030
	Mature Environment	P=0.022	P=0.223	P=0.005
<i>Number of Classes</i>	Mental facet	P=0.019	P=0.036	P=0.517
	Project method	P=0.000	P=0.000	P=0.006
	Mature Environment	P=0.325	P=0.713	P=0.044

Data source: Self-organized in this study

fects of Specialized Background on the correlations between Mental Facet ($p=0.011$), Mature Environment ($p=0.022$) and Innovative Approach, between Project Method ($p=0.000$) and Innovative Teaching Materials, and between Project Method ($p=0.030$), Mature Environment ($p=0.005$) and Innovative Environment that H7 was partially supported.

Moderating Effects of Number of Classes on the Correlations between Interaction in Teacher Professional Community and Innovational Instruction

The empirical results of Analysis of Variance, Table 2, showed the remarkable moderating effects of Number of classes on the correlations between Mental Facet ($p=0.019$), Project Method ($p=0.000$) and Innovative Approach, between Mental Facet ($p=0.036$), Project Method ($p=0.000$) and Innovative Teaching Materials, and between Project Method ($p=0.006$), Mature Environment ($p=0.044$) and Innovative Environment that H8 was partially supported.

CONCLUSION

The research results show the notably positive correlations between interaction in teacher professional community and innovative approach that teachers in professional communities could continuously share, dialogue, discuss, learn, and reflect the practical professional knowledge with supportive, trustable, reliable, and concerning minds and consensus in the common rules and places and further construct behaviors and methods for innovational instruction. Interaction in teacher professional community appears significantly positive correlations with innovative teaching materials that the community members would collaboratively explore, learn, assist, cooperate, dialogue, introspect, and modify the practice to construct new knowledge, pursue professional development for instruction improvement, innovational instruction methods, and produce and innovate in teaching materials. Interaction in teacher professional community appears remarkably positive correlations with innovative environment that the community members would mutually accept, concern, rely on, support, and forgive each other, present favorable friendship and partnership through in-

formal networking, and continuously learn, cooperate, and participate to contribute the environment and culture through the acquisition of cognitive resources and the brainstorming, communication, and learning of ideas in distinct domains.

RECOMMENDATIONS

Aiming at the above conclusion, the following suggestions are proposed in this study.

I. Encourage the Establishment of Communities

The educational administrative organizations should encourage colleges establishing Teacher Professional Community with subsidies and inviting experts for trainings so that the positive function of Interaction in Teacher Professional Community could rapidly enhance the professional development of college instructors, accumulate the professional knowledge, create the professional image, and further promote the national education quality and the positive function of Interaction in Teacher Community to encourage the participation of college instructors. It is believed that Interaction in Teacher Professional Community could enhance the instructors' morale and innovate in the instruction.

II. Holding Innovational Instruction Seminars and National Innovational Instruction Contest

The educational administrative organizations could invite experts designing curriculums for college instructors' innovational instruction and hold national seminars to enhance the perception and teaching skills of Innovational Instruction. Moreover, regularly holding national contests and public praise could encourage college instructors actively participating in the contests so as to effectively promote Innovational Instruction.

III. Plan Diverse Community Programs and Activities

With active management of teacher professional community and planning of diverse programs and activities, college instructors would actively participate in the community interaction, enhance the positive hope at work, and induce new ideas and high energy for innovational instruction.

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