A Leadership Model for Supporting the Mastery of Core Competencies for College English Learners in Application-Oriented Universities in Shanghai, China

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Abstract

On basis of Synergistic Leadership (Irby et al., 2002), Situational Leadership (Hersey & Blanchard, 2008), the support systems in Framework for 21st Century Learning (P21, 2019), and related research, this research employed questionnaire surveys and interviews in four application-oriented universities (AOUs) in Shanghai, characterized by disciplines of humanities, arts, technology, and health. Findings from questionnaire surveys and interviews showed that: 1) 45 leadership factors in the context of AOUs in Shanghai may be synthesized from dimensions of stakeholders' perceptions, leadership behaviors, and external forces; and 2) leadership styles may start at any point of directing to coaching styles, and gradually transform to supporting, and specific leadership behaviors have been provided to CE instructors or instructional leaders in determining or adapting situational leadership styles to learners' situation in AOUs in Shanghai. Based on the findings, the model *Leadership Atomium* was developed for instructional leaders and instructors to support learners' mastering CE core competencies for their better preparations for future life and work.

Keywords: core competencies, support systems, College English in application-oriented universities, leadership factors, leadership styles

1. Introduction

Current global changes have made it critical for learners to master core competencies for their success in the world today as well as in future. Such worldwide changes may include but not be limited to globalization and internationalization in various sectors, the rapid advance in information and communication technologies (ICT), the global outbreak of the pandemic, etc. Researchers, educational authorities, and institutes proposed various dynamic sets of core competencies sometimes with support educational systems to cater to such changes (Voogt & Roblin, 2012; EU, 2019; P21, 2019; Liu, 2022). The term "core competencies" is basically defined as the combination of such crucial components as knowledge, skills, attitudes and values required in the present and future social, economic, cultural, and ecological development.

Due to the dominant role of the English language in social and workplace communication worldwide, English language teaching (ELT) has been playing a vital role throughout most education systems worldwide. In China, College English (CE) education is implemented in all higher education institutions (CMOE, 2020). For decades, CE education in application-oriented universities (AOUs) has adopted content-based curriculum and instruction similar to that in research-oriented universities, which makes it necessary to determine the effective leadership to support the mastery of core competencies specifically for CE learners in AOUs.

1.1 Background of the Study

Education systems are required to be adapted to the context of significant changes by equipping learners with a set of higher levels of competencies (Voogt & Roblin, 2012; Lucas & Venckutė, 2020), such as critical thinking, communication skills, learning competencies (OECD, 2018; EU, 2019; P21, 2019; WEF, 2020; Lucas & Venckutė, 2020; CMOE, 2020), etc. Some well-accepted frameworks have identified and illustrated sets of educational elements to support learners in their mastering these required core competencies (Voogt & Roblin,

2012; Alismail & McGuire, 2015; Lewin & McNicol, 2015; OECD, 2018; EU, 2019; P21, 2019; WEF, 2020; Liu, 2022), e.g., sets of educational elements grouped into several categories (Liu, 2022) including standards, assessments, curriculum and instruction, professional development, and learning environments in P21 Framework (2019).

The core competencies expected to be enhanced in CE curriculum have been proposed in CMOE's (2020) officially-published *National Requirements for CE Teaching in China*, including four domains: language, culture, thinking, and learning competencies. Various types of higher educational institutions are encouraged to construct their own support systems according to respective contexts and situations to support their mastery of these core competencies (CMOE, 2020). For AOUs, the CE instructional leaders, experts, and instructors need to collaborate on supporting leadership to meet the requirements in their own contexts. The possible key to supporting leadership practices is to explore the expected synergistic leadership factors in a specific situation (Irby et al., 2002), and to match the situation with the appropriate leadership styles (Northouse, 2016), both of which are crucial in the organizations to boost transformation performance (Rahim et al., 2015). Shanghai is an internationalized city with rich educational resources, which makes it possible for the research to embark on the systematic reform of CE education in AOUs.

1.2 Research Objectives

The following research objectives guided this research:

1) To validate the leadership factors expected to support the mastery of core competencies for CE learners in AOUs in Shanghai, China.

2) To explore the leadership styles suitable to support the mastery of core competencies for CE learners in AOUs in Shanghai, China.

3) To develop a leadership model for supporting the mastery of core competencies for CE learners in AOUs in Shanghai, China.

2. Literature Review

2.1 Synergistic Leadership

Synergistic leadership (Irby et al., 2002) was developed from the system theory (Von Bertalanffy, 1976), the factors in which include: 1) beliefs, attitudes, and values, 2) leadership behavior, 3) external forces, and 4) organizational structure. It offers a model for leaders to analyze the factors in the interactions resulting in tension, conflicts, or harmony in a specific context, or to understand and create the interactive relationships among the systematic factors in an organization.

Synergistic Leadership (Irby et al., 2002) has been employed in the field of educational leadership including collaboration, empowerment, site-based decision-making, group problem solving (Irby et al., 2002; Yang, 2010; Laurelyn, 2016), etc. Researchers such as Kaspar (2006) and Laurelyn (2016) applied this theory and indicated that the Synergistic Leadership emphasizes contexts and situations, and is practical and helpful in understanding the synergistic systems. The theory has also been applied in the higher education system. Yang (2010) employed quantitative and qualitative analyses based on the data from education leaders respectively from 50 high-ranking public Chinese universities and 50 counterparts in the United States. With the shared leadership factors arising from the same elements in both cultures, such leadership was considered applicable to educational leaders in all sample universities. Liu and Chen (2021) synthesized a framework to analyze the situation and the solutions to developing China's application-oriented higher education, which offered references to applying Synergistic Leadership to address VUCA challenges (Kaivo-oja & Lauraeus, 2018) in the context of AOUs in China.

Based on this theory, Liu (2022) applied mixed research methods to identify 39 supporting leadership factors, categorized into synergistic leadership factors of stakeholders' perception (4 factors), leadership behaviors (28 factors), and external forces (7 factors), for the mastery of core competencies for CE learners in one of the AOUs in Shanghai, which may be regarded as part of pilot study for this research. The factors about stakeholders' perceptions were those of core competencies, of the necessity to embed them into CE curriculum, and of practical as well as professional learning; The 28 factors about leadership behaviors were analyzed from four aspects, among which the behaviors in curriculum and instruction accounted for 13 factors; The seven factors about external forces included industrial partners, international partners, peer universities, and resources in the community or the city.

2.2 Situational Leadership

Based on the prior research, Blanchard et al. (1985) developed the Situational Leadership II model, modifying the interaction between leadership types and followers' developmental levels. This model identified two key leadership styles, i.e., task (directive) behavior and relationship (supportive) behavior, which can be further classified into four subcategories, i.e., directing (high directive and low supportive behaviors), coaching (high directive and high supportive behaviors), supporting (low directive and high supportive behaviors), and delegating (low directive and low supportive behaviors). Meanwhile, it emphasized followers' development in determining appropriate leadership behaviors in terms of followers' competence (task development) and commitment (psychological development) to perform a required task.

Regarding assessing leadership styles, Hersey's observations (1985) suggested that followers' reports on a leader's behaviors should be preferred. Then, Blanchard et al. (1985) proposed that leaders' supportiveness and directiveness, together with followers' developmental levels, be the three variables in the measurement of leadership styles. All the three variables interacted with one another in determining followers' performance and attitudes toward the leader. Yeo (2020) claimed that leadership styles depended on leaders' behavioral attributes and effectiveness, such as communication skills, drive for performance, relationship-building ability, as well as responses to change, but the followers' perceptions were also decisive. While most studies used leaders' ratings to assess followers' development levels, Thompson and Glasø (2018) analyzed the survey data from both leaders and followers through the degree of agreement between leaders' rating and followers' self-rating to determine followers' competence and commitment, and consequently an optimal leadership style. Such applications in the academic attempts offered evidence for the implementing the Situational Leadership Theory in a specific educational context.

2.3 Educational Elements for Support Systems of CE Core Competencies

P21 (2019) illustrated the crucial educational support systems, including standards, assessments, curriculum and instruction, professional development, and learning environments. Meanwhile, these support systems have 25 educational elements to describe the connotation interpretation and the behavioral performance, such as applying the multiple mastery measures, making the feedback on learners' performance integrated into daily learning, integrating resources from communities, etc. Based on the framework (P21, 2019) and related research, Liu (2022) identified the educational elements for support systems of CE core competencies from three perspectives:

The first was from the learning frameworks well accepted worldwide. Compared with the P21 Framework (2019), some similarities were shared in the support systems of well acknowledged frameworks (OECD, 2018; EU, 2019; P21, 2019; WEF, 2020), such as formative and summative assessments, ICT assisted instruction, problem-based pedagogy, expanded community and international involvement, etc. External forces were regarded as a significant part in all support systems, e.g., communities beyond educational institutions (EU, 2019; P21, 2019), cooperation across sectors (EU, 2019), collaborative partners from industries (WEF, 2020), etc. The proposed "stakeholder engagement" (OECD, 2018) was aligned with Synergistic Leadership (Irby et al., 2002).

The second was from related research on leadership in ELT. The educational elements may include: significant changes to the ELT (Wyse & Moon, 2014), long-term instructional vision, and extra considerations to the contexts (Chan, 2021) in the support systems of standards and assessments; clear goal setting and leaders' role models (McGee et al., 2015), empowerment in ELT (McGee et al., 2015; Whitehead & Greenier, 2019), language teacher leadership (Shah, 2017), and the alignment of the instructional content, methods, and the assessments (Ni, 2017) in curriculum and instruction; ELT professional development (Slapac, 2021), instructional leaders' development, a broader professional thinking, and research team's engagement (Lesley et al., 2021) in professional development; resource supports, long-lasting external partnerships and collaborations (Slapac, 2021), dealing with crisis, and having authorities to make decisions on curriculum (Lesley et al., 2021) in environments.

The third was from related research on the leadership for facilitating learners' CE core competencies in four domains. For supporting the domain of language competencies, previous research showed instructors were called for to master the ELT criteria and required ICT operations, and to integrate modern ICT with ELT (Xiao-Pang et al., 2021); For supporting the domain of cultural competencies, Kivunja (2015) suggested to make learners be active listeners, involve learners in team building, information exchange, and encourage learners to work effectively in teams with diverse cultures. For supporting the domain of thinking competencies, the effective critical thinking instruction usually had the characteristics of providing opportunities to individual practice, and connecting the instructional materials with learners' respective educational and cultural background (Bağ & Gürsoy, 2021); For supporting the domain of learning competencies, the literature from Kivunja (2015) claimed

that the instruction strategies should focus on teaching learners skills of goals management, independent working, and self-directed learning.

However, scholars and researchers in China just started the studies on the core competences and the correspondent supporting leadership practices years ago, though it has become a research focus very soon. Moreover, the research on the leadership in ELT, especially on that specific for the mastery of core competencies for CE learners, has not been sufficient to date, even less in the context of AOUs in China.

3. Methodology

3.1 Sampling

Generally, probability sampling was adopted in this research. The first stage came to the cluster sampling. In this research, the general population included more than 100,000 CE learners from the AOUs scattered in the whole city with a geographic region of more than 6,000 square kilometers. Given the representativeness, universality and feasibility in this research, the sample learners and instructors were respectively from four clusters in terms of the disciplines of AOUs, i.e., humanities, arts, technology, and health. In the second stage, the simple random sampling was used to have four AOUs respectively from each cluster.

For questionnaire surveys, the respondents were randomly chosen from the target population of CE learners (freshmen and sophomores) and CE instructors in the four sample AOUs, according to the sampling methods proposed by Krejcie and Morgan (1970). As in Table 1, the questionnaire samples included 1378 learners, i.e., 689 freshmen and the equal quantity of sophomores, and 84 instructors.

Table 1. Population and Samples for Questionnaires

Universities	CE Learners Population	Learners Samples (freshmen, sophomores)	Instructors Population	Instructors Samples
A	5,600	360 (180, 180)	20	19
B	2,100	324 (162, 162)	16	15
C	10,200	370 (185, 185)	40	36
D	2,100	324 (162, 162)	15	14
Total	20,000	1,378 (689, 689)	91	84

For interviews, the simple random sampling and snowball sampling in interviews were feasible, and the sample statistics were also relatively reasonable. For the semi-structured interviews with more open-ended than strictly followed questions (Butin, 2010), each sample university, with the coding A, B, C, and D, applied simple random sampling to have one instructional leader, coded as A1, B1, C1, and D1, and snowball sampling to have one professor recommended by instructional leaders in the same university, coded as A2, B2, C2, and D2. In this research, four instructional leaders and four professors were the interview respondents, all of whom were asked to confirm their willingness to be online interviewed and screen-recorded.

3.2 Instrumentation

This research designed two sets of instruments, including questionnaires respectively for learners (A) and instructors(B), and baseline questions for the sample interviewees.

Questionnaire A and B were written in English with Chinese translation. Both were composed of four sections. Section one was the respondents' personal background information, such as the university, the gender, and the identity. Both the second and third sections referred to the 5-point scale proposed by Likert (1932), indicating the degrees of importance or agreement from personal perspectives. The second section were adapted from the questionnaires on "supporting leadership factors" developed by Liu (2022); whereas the third was for "supporting leadership styles", integrating educational elements into the subcategories of leaders' supportive or directive styles and the relationship between leader-member exchange (Blanchard et al., 1985; Hersey & Blanchard, 2008; Northouse, 2016). Section four was an open question designed to ask for extra suggestions.

The questionnaires were respectively pilot tested with 43 CE learners and 18 CE instructors in an AOU in Shanghai, China. All respondents were excluded from the samples in this research. The overall results were excellent with the alpha coefficients in Table 2.

Table 2. Reliability Statistics

		Cronbach's Alpha	N of Items
Questionnaire A	Section 2	.975	40
	Section 3	.951	15
	Overall	.977	55
Questionnaire B	Section 2	.970	50
	Section 3	.920	15
	Overall	.976	65

The baseline questions for interviewees were developed for the in-depth investigation into the considerations from instructional leaders and professors. The extended questions were put forward according to the interviewees' personal background, such as the position, the working experience, and the professional expertise. The interviews were designed mainly to distinguish the difference between support systems in research-oriented universities and those in AOUs, to make comments on the data collected and analyzed from the questionnaires, and to suggest leadership in enhancing CE learners' core competencies in AOUs.

For the data from the questionnaire surveys, means and independent samples t-test with SPSS Statistics 25 were employed, whereas the interview data was analyzed via content analysis (Mayring, 2000).

4. Findings

4.1 Supporting Leadership Factors

Results validated all 39 supporting leadership factors proposed in previous study (Liu, 2022), whereas some factors were revised and added to.

1) Stakeholders' perceptions

The results from questionnaires summarized in Table 3 showed little consensus from learners and instructors on the perceptions at the significant level of 0.05. All the learners and instructors held most positive perceptions of the importance of learners' mastery of learning competencies (Item 11, M=4, SD=0.953, N=1462), learners' mastery of language competencies (Item 8, M=3.89, SD=0.997, N=1462), and engaging learners with the real-world information, tools, and experts to solve practical problems in CE instruction (Item 15, M=3.93, SD=0.989, N=1462). In four CE core competencies, learners held least positive attitudes to the importance of cultural competencies (Item 9, M=3.69, SD=0.972, N=1378), whereas instructors thought the mastery of cultural competencies (M=4.58, SD=0.595, N=84) were less important than that of language competencies and learning competencies, but more than that of thinking competencies (Item 10, M=4.53, SD=0.683, N=84). Meanwhile, both learners and instructors were less positive to changing present CE curriculum and instruction, including materials, instructional methods, and understanding of ELT from instructors (Item 17, M=3.71, SD=0.991, N=1462).

All the interviewees acknowledged that the supporting leadership factors for the mastery of core competencies for CE learners should be aligned with the characteristics of support systems for core competencies of CE learners in AOUs. As to the results from the questionnaires, four of them added that it was important to develop learners' perceptions of interdisciplinary competences (A2, B1, D1, D2); and most suggested exam-oriented learning should be changed to competency-based learning with the learner-centered ideology, according to six interviewees' opinions (A1, A2, B1, C1, C2, D1), both of which were strongly suggested to be included in supporting leadership factors.

2) Leadership behaviors

According to Table 3, both CE learners and instructors accepted the importance of 18 leadership behaviors, including those in CE curriculum and instruction, assessments, and learning environment. Especially, samples were most willing to accept the importance of making learners have long-lasting learning motivation and proactive actions though with mistakes sometimes (Item 29, M=3.96, SD=0.926, N=1462). This was aligned with their perceptions of the importance of learners' mastery of learning competencies in CE instruction (Item 11). The second important leadership behavior went to the equitable access to quality learning tools, technologies, and resources (Item 41, M=3.94, SD=0.932, N=1462). The importance of selecting authentic, meaningful, and job-related language tasks for learning materials also gained intense attention (Item 22, M=3.94, SD=0.94, N=1462).

Especially, regarding the leadership behaviors about professional development, the importance of all the factors in the questionnaires gained positive attitudes from CE instructors. Besides the factors about external forces, they were related to: 1) "who" to be involved, i.e., research team (Item 50), instructional leaders (Item 51), and instructors (other items in this section); 2) "what" to be developed, i.e., the required ICT operations for ELT (Item 52), the ability to embed core competencies, contemporary tools, and instructional strategies in CE classrooms (Item 53), a deeper understanding of learning content (Item 54), and the ability to figure out learners' respective learning styles, advantages, and disadvantages (Item 56); and 3) "how" to enable professional development, i.e., to enable professional development communities (Item 55), and to enable instructors to collaborate, as well as share classroom practices and approaches to integrating core competencies into CE classrooms (Item 57).

Table 3. Results of Means and Analysis Independent Samples t-Test on Supporting Leadership Factors

Items (A & B)	Instructors (N = 84) M (SD)	Learners (N = 1378) M (SD)	Total (N = 1462) M (SD)	t	p	Items (B)	Instructors (N = 84) M (SD)
Stakeholders' Perceptions						**Professional Development**	
8	4.66 (0.505)	3.84 (1.001)	3.89 (0.997)	-12.713	0.000	48	3.80 (0.924)
9	4.58 (0.595)	3.69 (0.972)	3.74 (0.976)	-12.090	0.000	49	3.87 (0.984)
10	4.53 (0.683)	3.82 (0.981)	3.86 (0.980)	-8.501	0.000	50	4.01 (0.959)
11	4.64 (0.534)	3.96 (0.958)	4.00 (0.953)	-10.226	0.000	51	4.05 (0.815)
12	4.36 (0.761)	3.77 (0.991)	3.80 (0.989)	-5.067	0.000	52	4.09 (0.867)
13	4.28 (0.810)	3.80 (0.972)	3.82 (0.970)	-4.223	0.000	53	4.08 (0.860)
14	4.22 (0.858)	3.74 (1.006)	3.76 (1.004)	-4.132	0.000	54	4.24 (0.728)
15	4.37 (0.780)	3.91 (0.994)	3.93 (0.989)	-3.953	0.000	55	4.05 (0.831)
16	4.37 (0.709)	3.83 (0.947)	3.86 (0.943)	-4.841	0.000	56	3.95 (0.951)
17	4.18 (0.795)	3.68 (0.994)	3.71 (0.991)	-5.305	0.000	57	4.00 (0.894)
Leadership Behaviors							
18	4.16 (0.749)	3.86 (0.996)	3.87 (0.986)	-3.354	0.001		
19	4.16 (0.849)	3.79 (0.977)	3.81 (0.973)	-3.231	0.001		
20	4.22 (0.793)	3.84 (0.955)	3.86 (0.950)	-3.423	0.001		
21	4.12 (0.799)	3.81 (0.950)	3.82 (0.945)	-2.812	0.005		
22	4.26 (0.700)	3.89 (0.939)	3.91 (0.932)	-3.447	0.001		
23	3.92 (0.920)	3.58 (1.061)	3.60 (1.057)	-2.741	0.006		
24	4.17 (0.885)	3.79 (0.976)	3.81 (0.975)	-3.335	0.001		
25	4.11 (0.842)	3.74 (0.983)	3.75 (0.980)	-3.695	0.000		
26	3.88 (0.966)	3.75 (1.000)	3.76 (0.998)	-1.089	0.276		
27	4.11 (0.946)	3.82 (0.981)	3.83 (0.981)	-2.478	0.013		
28	4.33 (0.551)	3.88 (0.940)	3.90 (0.928)	-6.626	0.000		
29	4.37 (0.585)	3.94 (0.936)	3.96 (0.926)	-3.958	0.000		
30	3.12 (1.154)	3.70 (1.036)	3.67 (1.050)	4.699	0.000		
31	3.80 (1.020)	3.76 (1.014)	3.76 (1.014)	-.355	0.723		
32	4.03 (0.952)	3.81 (0.971)	3.82 (0.971)	-1.887	0.059		
33	3.95 (0.951)	3.78 (0.942)	3.79 (0.943)	-1.505	0.133		
34	4.13 (0.929)	3.72 (0.995)	3.74 (0.996)	-3.537	0.000		
35	3.86 (0.934)	3.71 (0.986)	3.72 (0.984)	-1.241	0.215		
36	4.09 (0.715)	3.78 (0.953)	3.80 (0.944)	-3.600	0.001		
37	3.76 (1.044)	3.72 (0.983)	3.73 (0.986)	-.331	0.740		
38	4.08 (0.935)	3.77 (0.971)	3.79 (0.971)	-2.688	0.007		
39	3.99 (0.872)	3.74 (0.994)	3.75 (0.989)	-2.410	0.018		
40	4.05 (0.922)	3.84 (0.973)	3.85 (0.971)	-1.831	0.067		
41	4.18 (0.828)	3.93 (0.944)	3.94 (0.940)	-2.308	0.021		
42	4.11 (0.842)	3.89 (0.912)	3.90 (0.909)	-2.027	0.043		
External Forces							
43	3.72 (1.015)	3.81 (0.957)	3.81 (0.960)	0.761	0.447		
44	3.86 (0.890)	3.77 (0.974)	3.77 (0.969)	-0.780	0.435		
45	3.96 (0.824)	3.79 (0.965)	3.80 (0.959)	-1.465	0.143		
46	4.03 (0.832)	3.83 (0.967)	3.84 (0.961)	-1.736	0.083		
47	3.86 (0.905)	3.79 (0.932)	3.79 (0.930)	-0.624	0.533		

Data also showed the significant consensus on the importance of seven leadership behaviors at the level of 0.05. Specially, similar to the results in previous study (Liu, 2022), though no significant difference were indicated between learners and instructors in the perspectives on employing game-based learning (Item 30), learners were more positive to it (M=3.7, SD=1.036, N=1378), whereas instructors considered it much less important (M=3.12, SD=1.154, N=84).

In the interviews, four interviewees thought that prime attention should be paid to the standards determined for four domains of CE core competencies in the syllabus. Secondly, the interviewees analyzed that both learners and instructors concerned most about the learning content (A1, B1, C1, D1, D2), e.g., selecting, even adapting, the learning content for supporting the development of CE learners' core competencies (A1, B1, C1, D2); then about the learning environment (B1, C1, D1). Then, the disagreement seen from the data made it necessary for instructors to develop essential educational competences to influence or change learners' attitudes (B1, C2, D1), and to understand the way learning content may actually facilitate CE core competencies (C1, D2). Furthermore, it was stressed to apply ICT in CE instruction and assessments (A2, B1, B2, C2, D1, D2), and to enhance ICT competences in professional development (B1, B2, C1, C2, D1), both of which should be beneficial for instructional team to develop MOOCs or SPOCs for learners' improvement of CE core competencies (B2, C2, D1). As to the game-based learning, involving such innovative approach into professional development before classroom practice may be helpful (A1, A2, B1, D1).

3) External forces

Tables 3 also showed that learners and instructors had similarly positive perspectives on the importance of all the illustrated external forces. Some important factors of external forces about professional development also gained more concerns from instructors, including professional development communities across institutions (Item 48, M = 3.8, SD = 0.924, N = 84), and programs with the cooperation from industrial partners (Item 49, M = 3.87, SD =0.984, N = 84). Results indicated that learners and instructors had no difference in the importance of all these leadership factors at the significance level of .05, i.e., $t(1460) = 0.761$, $p = 0.447$; $t(1460) = -0.78$, $p = 0.435$; $t(1460) = -1.465$, $p = 0.143$; $t(1460) = -1.736$, $p = 0.083$; and $t(1460) = -0.624$, $p = 0.533$.

All the interviewees agreed and stressed especially on the supporting role of external resources in enhancing job-related skills, such as education-industry collaboration in practical learning (all interviewees) and the involvement of industrial leaders in ESP learning (A1, C2). Other factors included the international collaboration in online learning (A1, A2, B2, D1), and the resources available in public services like city museums (A1, B1, D2), libraries (B1, C1, C2, D1), and local cultural heritage (A1, A2, B2), to support the improvement in learners' cultural and learning competencies.

4) Summary of findings on supporting leadership factors

According to the findings, one of the 39 leadership factors of external forces listed in previous pilot study (Liu, 2022) may be revised for the role of industrial leaders is more important in ESP instruction as proposed in the interviews.

Meanwhile, besides the validated leadership factors (Liu, 2022), the data from this research showed six more factors may be added to the list.

For stakeholders' perceptions:

(1) Learners' perceptions of interdisciplinary competences;

(2) Stakeholders' attitudes to the competency-based curriculum, especially the learner-centered ideology.

For leadership behaviors:

(3) Manifesting the standards of four domains of core competencies for CE learners in the syllabus;

(4) Selecting and adapting the authentic, meaningful, and job-related teaching content for developing learners' core competencies;

(5) Building instructional teams to develop MOOCs or SPOCs focusing on the improvement of core competencies;

For external forces:

(6) Access to the resources in public service system, e.g. museums, libraries, cultural heritage, etc.

4.2 Supporting Leadership Styles

The results of means and independent samples *t*-test were summarized in Table 4.

Table 4. Results of Means Analysis and Independent Samples t-Test on Leadership Styles

Items (A)	Freshmen (N = 689) M (SD)	Sophomores (N = 689) M (SD)	Items (B)	Instructors (N = 84) M (SD)	Total (N = 1462) M (SD)	t	p
48	3.88 (0.940)	3.85 (0.924)	58	3.97 (0.848)	3.87 (0.928)		
49	3.96 (0.919)	3.94 (0.891)	59	3.93 (0.869)	3.95 (0.904)		
50	3.93 (0.918)	3.93 (0.905)	60	4.13 (0.789)	3.94 (0.906)		
51	3.96 (0.904)	3.91 (0.898)	61	4.04 (0.791)	3.94 (0.894)		
M_S	3.93 (0.836)	3.91 (0.819)		4.02 (0.699)	3.93 (0.821)	-1.151	0.25
52	3.89 (0.898)	3.86 (0.910)	62	4.03 (0.832)	3.89 (0.899)		
53	3.85 (0.922)	3.83 (0.918)	63	4.00 (0.800)	3.85 (0.913)		
54	3.87 (0.919)	3.83 (0.959)	64	4.11 (0.810)	3.87 (0.929)		
55	3.91 (0.913)	3.88 (0.897)	65	4.13 (0.772)	3.91 (0.900)		
M_D	3.88 (0.810)	3.85 (0.819)		4.07 (0.684)	3.88 (0.807)	-2.333	0.02
56	3.76 (0.990)	3.70 (0.962)	66	3.88 (0.924)	3.74 (0.976)		
57	3.91 (0.890)	3.87 (0.900)	67	4.19 (0.799)	3.91 (0.891)		
58	3.89 (0.930)	3.87(0.908)	68	4.02 (0.836)	3.89 (0.917)		
59	3.92 (0.899)	3.91 (0.894)	69	4.01 (0.871)	3.92 (0.895)		
60	3.91 (0.917)	3.92 (0.883)	70	4.06 (0.782)	3.92 (0.897)		
61	3.90 (0.938)	3.92 (0.882)	71	4.13 (0.803)	3.92 (0.911)		
62	3.98 (0.946)	3.99 (0.867)	72	4.13 (0.803)	3.99 (0.909)		
M_LMX	3.90 (0.810)	3.88 (0.759)		4.06 (0.686)	3.90 (0.807)	-1.928	0.54

Note: M_S = Means of supportive styles; M_D = Means of directive styles; M_LMX = Means of leader-member exchange; two independent variables for the analysis of *t* and *p*: corresponding means of learners (freshmen and sophomores) and instructors.

Generally, the respondents expected high directive styles (*M*=3.88, *SD*=0.807, *N*=1462) and even higher supportive styles (*M*=3.93, *SD*=0.821, *N*=1462) in supporting the mastery of core competencies for CE learners. In the supportive styles, the leadership behavior to help learners feel comfortable in the mastery of core competencies (Item 49/59) was highly agreed with by both freshmen (*M*=3.96, *SD*=0.919, *N*=689) and sophomores (*M*=3.94, *SD*=0.891, *N*=689), whereas instructors thought it less important than their other concerns (*M*=3.93, *SD*=0.869, *N*=84). The behavior to communicate actively with learners (Item 50/60) was concerned much more by instructors (*M*=4.13, *SD*=0.789, *N*=84), which gained agreement from sophomores (*M*=3.93, *SD*=0.905, *N*=689) but a little lower from freshmen (*M*=3.93, *SD*=0.918, *N*=689) compared to their agreements with other items. Besides, freshmen also had nearly strong agreement with the behavior to help learners get along with each other (*M*=3.96, *SD*=0.904, *N*=689). As in Table 4, learners and instructors showed no significant disagreement on the supportive styles at a significance level of 0.05, *t*(1460) = -1.151, *p* =0.25.

As to the directive styles, the highest agreement hit on the behavior to empower learners to do high-quality work in the mastery of core competencies (Item 55/65) from all freshmen (*M*=3.91, *SD*=0.913, *N*=689), sophomores (*M*=3.88, *SD*=0.897, *N*=689), and instructors (*M*=4.13, *SD*=0.772, *N*=84). It was indicated in Table 15 that learners and instructors had significant difference in the agreement on the directive styles at a significance level of 0.05, *t*(1460) = -2.333, *p* =0.02. Such difference was firstly manifested in instructors' higher agreement on directive styles than that on supportive styles, whereas learners were reverse in these two styles of leadership behaviors.

The leader-member exchange was gained close to strong agreement from all learners and instructors (M=3.90, SD=0.807, N=1462). Among all these items, sophomores showed least strong agreement on that learners know how to finish the language learning tasks for the mastery of core competencies to satisfy the instructor (Item 56, M=3.70, SD=0.962, N=689), same as the bottom ranking of agreement from instructors (Item 66, M=3.88, SD=0.924, N=84). Both freshmen and sophomores most strongly agreed that learners' relationship with the instructor is effective in the mastery of core competencies (Item 62, M=3.98, SD=0.946, N=689; M=3.99, SD=0.867, N=689), whereas instructors also strongly agreed (Item 72, M=4.13, SD=0.803, N=84). The instructors' most favoured leadership behavior was to understand learners' problems and needs in the mastery of core competencies (Item 67, M=4.19, SD=0.799, N=84). Table 15 suggested that learners and instructors had no significant difference in the agreement on the leader-member exchange behaviors at a significance level of 0.05, t(1460) = -1.928, p =0.54.

The interview data was also treated via content analysis (Mayring, 2000). Firstly, both relationship-related and task-related leadership styles were valued by all the interviewees. The data from interviews showed that three instructional leaders (A1, B1, C1) suggested that the leadership styles adopted for freshmen start from directing style, i.e., high directive and low supportive styles (Blanchard et al., 1985), according to CE learners' situations. Then, all the CE instructional leaders and professors agreed with the leadership styles summarized from the questionnaire surveys, which transformed from coaching, i.e., high directive and high supportive behavior, to supporting, i.e., high supportive and low directive behavior, based on Situational Leadership theory (Blanchard et al., 1985). Furthermore, they suggested the process of transformation in leadership styles should follow the gradual approach based on learners' various development situations.

Regarding the learners' different situations of gender, English language proficiency and English learning years, more attention was attracted to the supportive behaviors of providing socio-emotional support for different learners in the development of core competencies, such as encouragements (A2, B1, B2, C2, D2), active listening (A1, B1, D1), care (B1, D1, D2), trust (A1, C2), reflection (B1), etc. Extra supportive leadership behaviors were illustrated for more collaboration among the diverse learners, such as encouraging learners to communicate more (all interviewees), establishing learning communities with diverse learners mixed together (A2, B1, C1), creating cooperative atmosphere in CE learning (B2, D2), etc. Meanwhile, corresponding directive behaviors were employed to facilitate every learner at different level to enhance such cooperative learning, such as setting examples in learners' mastery of core competencies (A2, C1, D2), focusing more on the learning strategies for different learners in improving higher-level thinking skills and intercultural competences (A1, C2, D2), helping learners to demonstrate their learning products in communities (B1, B2, C2, D1, D2), etc.

As to the learning interests, the supportive behavior like stimulating learners' common enthusiasm for CE learning was in the list from all interviewees. Two of the interviewees (A2, C2) also believed such directive behavior as providing appealing multimodal resources for independent learning would arouse learners' more learning interests, especially for sophomores since data showed less interests in learning CE.

Considering the learning purposes, five interviewees (A1, A2, B2, C1, D2) advised to attach importance to the supportive behavior of understanding learners' diversity in learning purposes. All of the instructional leaders stressed the directive behaviors of developing sustainable learning competencies for further academic study, e.g., forming learners' consensus on the development of core competencies in CE learning, as well as the behaviors like explaining the requirements and direction of CE learning and improving learners' problem-solving skills in the mastery of core competencies.

More concerns went to the significantly related learning purposes for preparing better for the discipline study and then for getting a good job. Such supportive leadership behaviors included stimulating enthusiasm especially for ESP learning (all interviewees), encouraging learners to communicate more with industrial leaders (A2, B2, C1, D1, D2), and establishing a good relationship with external forces for practical and professional learning (B1). The directive leadership behaviors consisted of connecting CE learning with discipline and practical learning (B2, C2, D1) and guiding learners to utilize external resources for practical and professional learning (B1, B2, C1).

Besides, the interviewees emphasized the role of development level of learners' core competencies in determining leadership styles, and provided extra considerations, such as: the transformation of leadership styles should be learner-centered (B1, C2, D1); the leadership styles should be adjusted any instant when situations changed (A2, B2, C1, C2, D2); the leadership behavior related to stakeholders perceptions and external forces with the characteristics of AOUs may be integrated into leadership styles (A1, B1), etc.

More specifically, the behaviors synthesized in Table 5 based on the results from questionnaire surveys and interviews may be helpful for CE instructors or instructional leaders in determining or adapting situational leadership styles to learners' situation in AOUs in Shanghai.

Table 5. Specific Behaviors for Directive and Supportive Leadership Styles

Learners' situation	Directive styles (D)	Supportive styles (S)
Individual diversity in gender, English language proficiency, and English learning years	1) Empowering learners to do high-quality work in the mastery of core competencies 2) Defining role responsibilities for each of learners in the mastery of core competencies 3) Setting a clear goal for learners' action to master core competencies 4) Making suggestions about how to solve problems in the mastery of core competencies 5) Setting examples in learners' mastery of core competencies 6) Focusing more on the learning strategies for different learners in improving higher-level thinking skills and intercultural competences	1) Communicating actively with learners 2) Helping learners get along with each other 3) Understanding learners' problems, learning styles and learning needs in the mastery of core competencies 4) Recognizing learners' potential in the mastery of core competencies 5) Providing socio-emotional support for different learners in the development of core competencies 6) Encouraging learners to communicate more with instructors and peers 7) Establishing learning communities with diverse learners mixed together 8) Creating cooperative atmosphere in CE learning
Different degrees of learning interests	7) Providing appealing multimodal resources for independent learning 8) Helping learners to demonstrate their learning products in communities	9) Acting friendly and helping learners feel comfortable in their mastery of core competencies 10) Stimulating learners' common enthusiasm for CE learning
Various learning purposes for getting good jobs, for preparing better for discipline study, and for academic degrees	9) Guiding learners to utilize external resources for practical and professional learning 10) Connecting CE learning with discipline and practical learning 11) Explaining the requirements and direction of CE learning 12) Improving learners' problem-solving skills in the mastery of core competencies	11) Stimulating enthusiasm especially for ESP learning 12) Understanding learners' diversity in learning purposes 13) Encouraging learners to communicate more with industrial leaders 14) Establishing a good relationship with external forces for practical and professional learning 15) Forming learners' consensus on the development of core competencies in CE learning

4.3 Leadership Model

Based on the findings from all the previous research objectives, a leadership model (Figure 1) was synthesized for supporting the mastery of core competencies for CE learners in AOUs in Shanghai, China. As the figure shows, *Leadership Atomium* is a model composed of leadership factors and leadership styles centering around CE learners together with the core competencies for them. With the "molecule" of atom-structured leadership factors and the permeating leadership styles, the structural metaphor indicates the synergistic and situational leadership applied to support the mastery of core competencies for CE learners with the considerations to the contexts and situations.

Specifically, the leadership factors include three synergistic categories with four subcategories respectively. First is about stakeholders' perceptions at the top, which of competency-based curriculum and interdisciplinary learning are added to in this research. Second is about leadership behaviors in four aspects among support systems (P21, 2019), among which the leadership behaviors in curriculum and instruction are valued most. Last but not the least is about external forces with more focus on industries for CE in AOUs.

The leadership styles should be adapted according to the situations of CE learners. Thus, it has no fixed start point in the process from directing styles to coaching. However, the dominant leadership styles in supporting CE learners' development of core competencies should be coaching styles and gradually changed to supporting styles.
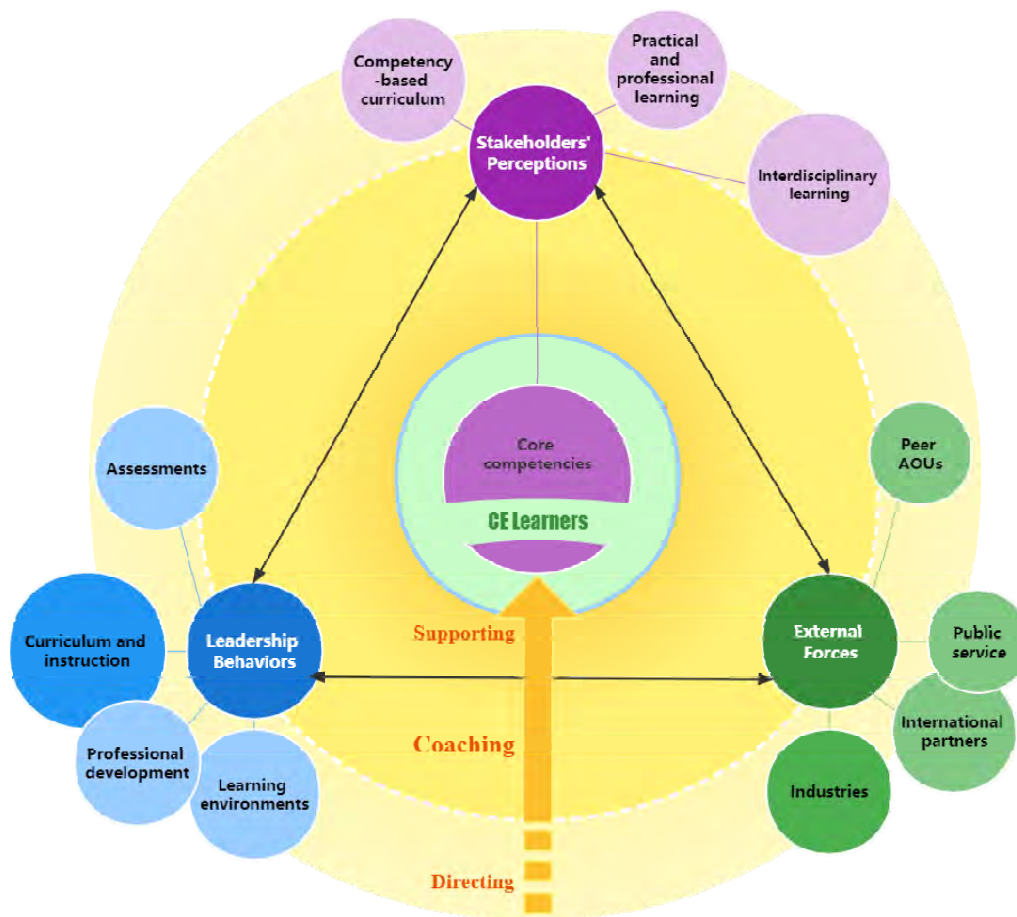

Figure 1. Leadership Atomium for Supporting the Mastery of Core Competencies for CE Learners

5. Conclusion

To prepare learners better for future life and work in current global changes, ELT researchers and policy makers have framed core competencies in four domains for CE education (CMOE, 2020). With the conventional content-based approach implemented in CE education for a long time (Ni, 2017), systematic and appropriate supporting leadership is thus required for competency-based ELT. This research developed the model *Leadership Atomium* composed of leadership factors and leadership styles with CE learners and the core competencies for them at the center, which may be applied directly by corresponding instructional leaders and instructors. Such structural metaphor indicates the atom-structured leadership factors and the permeating leadership styles are dynamic and systematic in the ecosystem of CE education in AOUs in Shanghai.

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