

Science Teachers and Students' academic Emotions in Chinese Education Context

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Abstract

In this study, an international high school in China offering the International Baccalaureate (IB), and American Advanced Placement program (AP) was investigated in order to understand the teaching and learning emotions of science teachers and students during class under the context of international school policies, as well as their attitudes towards international education policies. This study in turn provides recommendations for the reform and innovation of international education policy of China. Online semi-structured interviews with 4 science teachers and 8 students were conducted to obtain the in-depth data. Teachers' teaching emotions are measured by a modified Teacher Emotions Scale (TES) and students' learning emotions are measured by a modified Achievement Emotions Questionnaire (AEQ). Atlas.ti 22 was used for this qualitative descriptive analysis. The analysis illustrates that teachers' teaching emotions and the students' learning emotions illustrate a reciprocal effect. Most science teachers have a neutral, but not indifferent, attitude towards international education policy. Additionally, the majority of students hold a positive attitude towards the international education policy.

Key words: Chinese education context; international school curriculum policy; teaching emotions; learning emotions; AEQ; TES.

Introduction

In China, international education programs have become increasingly popular in recent years. This is attributed to the emphasis upon quality education in contemporary communities in the context of globalization and informatization, which is far more significant than it was in the past. Generally, the demand for tertiary education has become generalized, and national policy has achieved the massification of tertiary education rather than elitism (Huang, 2003). However, in China, the barrier that prevents the majority of high school students from entering higher education is the national college entrance exam (NCEE). It cannot be denied that the admission rate to higher education in China is becoming increasingly high. Besides, it is still extremely difficult to enroll in well-known universities. In China, people usually compare NCEE¹ as an academic “single wooden pole bridge”. Although there are close to 1.5 million high school candidates each year, only about 150,000 (1% out of the candidates) are able to enroll in Chinese top universities. The ingrained traditional thinking of Chinese people is that students only graduate from the top higher education institutions can have a successful life in the future (Liu & Helwig, 2020). In order to enter a top university, Chinese students are undergoing both physical and mental stress (You & Hu, 2013). The prevalence of depression among primary and secondary school students is showing an increasing trend (Zeng et al., 2016). Well-off families notice these situations and are willing to pay for high tuition fees in order to let their children study at international schools (Poole, 2018). This is because at international schools, the pressure of learning is relatively stress-free for students. After graduating from international high schools, students can apply for worldwide top higher education institutions and study overseas. Some countries have commodified education under the ideology of neoliberalism (Wells et al., 1998).

¹ Chinese college entrance exam (NCEE)

Universities in these countries are certainly willing to receive high tuition fees from international students to develop their own institutions.

International schools are a product of economic globalization. It has enabled the opening and diversification of education in China and has contributed to the reform of local education in China. Conducting a quick literature search in Web of Science, a database of psychology and education, it was found that a large number of articles discussing education policies in China focused on NCEE² education policies, such as You and Hu (2013), Zeng et al. (2016) and, Zhang (2013), and rarely on international education policies. Besides, the control-value theory of achievement emotions mentions that teachers' teaching emotions have an impact on students' learning emotions, which ultimately affects their academic performance (Frenzel et al., 2016, and Pekrun, 2006). In addition, most of the literature, led by Frenzel et al. (2016) and Pekrun (2006), is about the mathematics classroom and very few studies are about the science class. However, to what extent the international high school programs in China have affected the academic performance of Chinese students in science study is still a problem that needs to be explored. In this study, academic emotions of students and science teachers at an international high school in China will be measured to show the impact of the international program on Chinese students' learning emotions, and science teachers' teaching emotion. In turn, policy reform methods for the international curriculum in China will be proposed.

Research question:

The purpose of this study is to investigate the impact of the current policies of the international high school in China on the academic emotions of science teachers and students, and their perspectives on international education. Meanwhile, the academic emotions of science teachers

² college entrance exam (NCEE)

and students will be measured. Besides, suggestions for the enhancement of curriculum policies will be presented in this study as it relates to the academic emotions of science teachers and students.

The aforementioned overarching aims lead to the following research question:

“To what extent do science teachers and students experience academic emotions under the current international school’s policy in the mainland of China?”

The following sub-questions can provide an in-depth explanation for the research question:

1. To what extent do science teachers experience teaching emotions under the school policy?
2. What do science teachers think about the ongoing school policy?
3. To what extent do students experience learning emotions under the schools’ policy?
4. What do students think about the ongoing school policy?
5. Is there a difference in students’ learning emotions and thoughts about the ongoing school policy between teachers traditional versus international educational background?

Background for the research

Investigation Background

Teachers and students' teaching and learning emotion

There is no denying that students' participation and their learning emotions in the classroom play an indispensable role in determining their academic performance. This is the result of previous studies on students' learning emotion in math class. (Pekrun, 2006; Pekrun et al., 2011). Pekrun (2006) proposes the control-value theory of achievement emotions, which states that an appreciation of control and value is central to evoking

“Achievement emotions, including learning emotions related to activities such as enjoyment, frustration, and boredom experienced in learning, as well as outcome emotions related to success or failure such as enjoyment, hope, pride, relief, anger, anxiety, shame, hopelessness, and boredom” (Pekrun, 2006, p. 315).

Other than students' learning emotions, teachers' teaching emotions also play a decisive role in students' learning. Frenzel et al. (2016) also emphasizes that teachers' classroom emotions in the classroom not only have an impact on their own well-being, but also on the operation of the classroom. From the perspective of perceived social support, a positive classroom climate can stimulate students' positive classroom emotions (Ahmed et al., 2008). In other words, teachers' positive classroom emotions such as enjoyment can produce a positive classroom environment. This also has a moderating effect on students' positive classroom emotions.

According to Frenzel et al. (2016), positive classroom emotions not only help teachers to develop good interpersonal relationships, but also help them to reduce the burden of work and increase their satisfaction and well-being. In contrast, negative classroom emotional awareness causes anxiety and depression, besides being detrimental to teachers' physical and mental health. Teacher Emotions Scale (TES) was developed for teachers to self-report their classroom

emotions, enjoyment, anger, and anxiety about the teaching process. Frenzel et al. (2016) tested the reliability, internal and external validity, and cross-linguistic equivalence of the German and English versions of the TES³ separately. They also investigated the effects of and student-group specific variables. They found that the teacher's three-factor models factor (enjoyment, anxiety, and anger) outperformed the two variable factors with only positive and negative classroom emotion, so that the internal validity of the scale could be maintained. External validation analyses provided consistent evidence for the theoretical significance of teachers' general affect, burnout, job satisfaction, and teacher self-efficacy. In addition to this, they found consistency between the results of the scale's analysis and students' evaluations of teachers' teaching behaviors. They also found that teachers' classroom emotions had an impact on students' classroom and learning emotions as well (Frenzel et al., 2016).

Students' achievement emotions are related to motivation, strategies, self-regulation, and performance (Pekrun, 2006). Pekrun (2006) also noted that students' achievement emotions influence students' academic achievement in educational practices. Educators should identify and understand students' achievement emotions and provide immediate interventions or change teaching strategies to enhance students' positive achievement emotions, increase their learning engagement, and help them to achieve successfully. Pekrun developed Achievement Emotions Questionnaire (AEQ). The instrument comprises 24 scales for measuring students' enjoyment, hope, pride, relief, anger, anxiety, shame, hopelessness, and boredom before, during, and after class, learning, and examinations. The results showed its reliability, and the soundness of its internal and external validity through the value of students' control-value assessment, academic and academic performance.

³ Teacher Emotions Scale (TES)

The classroom emotions of teachers and students are also influenced by the school's context and curriculum policy. According to Ahmed et al., (2008) and Oosterhoff et al. (2020), the school environment has an impact on students' and teachers' self-competence, self-autonomy, and self-relatedness, ultimately influence their teaching and learning process. Currently, however, the curriculum of international high schools has not been developed in accordance with the viewpoint presented above, but rather seeks to approach the theory of powerful knowledge, that is, there are boundaries between knowledge (Young & Muller, 2014). To illustrate, schools and teachers concentrate too intensively on student academic performance, therefore, interdisciplinary activities are rarely carried out. However, the idea proposed by powerful knowledge that schools should have highly equipped laboratories and studios to meet the needs of students and teachers for the construction of powerful knowledge, and that all teachers should be elite teachers, has not been met (Young, 2008). Actually, such requirements would be very difficult to achieve for even the most developed countries in the world, such as the UK (Young, 2008). The powerful knowledge perspective was rejected by Priestley and Sinnema (2014) and a competency-based curriculum theory was introduced.

Competency-based curriculum is driven by the demands of the 21st century market economy and the human resource needs (Priestley & Sinnema, 2014; Tarmo & Kimaro, 2021). It contains four features: "competency-based curriculum", "learner-centeredness", "teacher as a facilitator of learning", and "teacher autonomy" (Tarmo & Kimaro, 2021; Priestley & Sinnema, 2014). Priestley & Sinnema (2014) also states that schools should educate students on a wide range of competencies rather than specific learning contexts. Additionally, competency-based curriculum exams should be set with variety and not be limited to the examination of subject knowledge. Assessment can be done by means of students' portfolios that record their progress,

completion of their own projects or small-scale studies, and the demonstration of what they have learned (Tarmo & Kimaro, 2021). Moreover, schools and teachers should help students design their own learning plan and course schedule based on their specific needs, potential, and interests, rather than having the same schedule and plan for every student in the school (Chuenjitwongsa et al., 2018). Thus, compared with a curriculum prompted by powerful knowledge, the competency-based curriculum promotes the competence, autonomy, and relatedness of students and teachers.

Current curriculum policies for international high schools in China

Globalization emphasizes interconnection and interdependence between countries. It brings a huge change to politics and economy throughout the world, and with the reform of political regimes and economies, education policy globalization has become common in the majority of countries in the world (Wells et al., 1998). According to the research of the Center for China and globalisation (2021), the number of Chinese students has been flourishing in recent years. The most popular destinations for Chinese students are the developed Western countries represented by the US, UK and Canada. From 2016 to 2019, the number of Chinese students studying abroad is on a growth trend. Although the number of Chinese students studying abroad has decreased in the post-epidemic era, a large number of Chinese students still go overseas to study every year. It is obvious that international education is becoming more and more popular in the Chinese educational market. It is certainly necessary for fundamental education in China to seize the pattern of market development and vigorously develop fundamental international education.

The most popular international education programs in China are International Baccalaureate (IB), American Advanced Placement program (AP) and General Certificate of

Education Advanced Level (A-level) programs (Wright et al., 2021). This is because these three programs are globally recognized by the highest level of higher education institutions. Generally, each school offers one program or more than one of these three programs to cater to the needs of students preparing to study abroad. The philosophy behind the IB program is Education for Life. According to International Baccalaureate Organisation IBO (2017), the IB program through comprehensive and balanced academic disciplines and challenging assessments, cultivates students to become ideal, internationally conscious citizens with a strong sense of responsibility, critical, compassionate thinkers and lifelong learners. Additionally, it trains students to become international citizens who are familiar with both their own countries and the international community. This goal is highly consistent with the worldwide efforts of higher education, and highlights the high quality and credibility of the international literature recruitment program. The IBO requires students to take one course in each of six groups for two years of study. Students have the option of taking three high level (HL) courses and three standard level (SL) courses based on their interests, learning abilities and future professional inclinations. The six areas are language (native and second language), humanities, natural sciences, technology, and the arts. In addition, students are required to complete three core courses: Theory of Knowledge (TOK), Extended Essay (EE), and Creativity, Activity, Service (CAS). Throughout the IBO policy document, International Baccalaureate Diploma Programme (IBDP), which is a pre-university subject offered by the IBO curriculum organization for youth aged 16-19, presents a very rigid challenge to both IB students and teachers. Not only does it challenge students to develop comprehensive learning skills, but it also requires IB teachers to have a holistic approach to teaching. This is because it emphasizes the overall harmonization of knowledge. Particularly, the

three core courses require students and their supervisors to have interdisciplinary thinking skills and the ability to integrate knowledge from different academic research fields.

In the US, the AP program⁴ is the highest-level course in American high schools. It is similar to the IBDP program⁵ in that it responds to the integrative development of disciplines and the evolution of educational requirements. At the same time, it carries the role of a bridge between high school education and tertiary education. The AP program was started by the American College Board [CB] in 1955 (College Board, 2000). The CB has made Excellence and Equality as its goal and principle. According to College Board (2000), the primary purpose of the AP program is to prepare students for higher education. It provides a high quality of teaching and learning that successfully connects secondary and higher education. Also, the CB organization requires teachers to constantly develop students' potential during the teaching process. Therefore, the AP program requires a high level of expertise of AP teachers, but the AP program does not expect teachers to have the ability to teach across disciplines. The AP program consists of 22 disciplines and 37 courses covering literature, humanities, art, nature science, mathematics, and other subject areas, and is highly relevant to the common majors. The AP exams are scored on a 5-point scale, and students who achieve a score of three or higher will have the opportunity to earn college credit or gain direct admission to higher-level courses in tertiary institutions. This also reflects the highly connected nature of the AP program to the college curriculum.

This thesis focusses on the IB and the AP programs at Suzhou Industrial Park Foreign Language School [SIPFLS]. In an interview with the principal Tan of SIPFLS-school, the researcher learned that the school chose the two programs (i.e., the IB and the AP) as the

⁴ American Advanced Placement program (AP)

⁵ International Baccalaureate Diploma Programme (IBDP)

school's main curriculum because of the IBO⁶'s comprehensive learning and teaching goals for students and teachers. Also, due to the fact that the first overseas study destination of Chinese students is America. Students are placed in programs based on their potential and results of the placement test when they enter Year 10. Students who got high grades will be assigned to the IBDP program⁷, and students with slightly lower grades will be assigned to the AP program⁸. In addition, the school will also consider the student's future study destination. If the destination is the US, the school will place the student in the AP program with the consent of the students and their parents. Furthermore, the school also gives a lot of consideration to the recruitment and placement of teachers. As this is an international high school, the school tends to recruit teachers with international master's degree education backgrounds. However, teachers who graduated from China's top universities with master's degrees are also considered for school recruitment. Nevertheless, novice teachers are assigned to teach AP subjects, because the IB program⁹ requires a high level of professional competence and interdisciplinary teaching skills.

⁶ International Baccalaureate Organisation [IBO]

⁷ International Baccalaureate Diploma Programme (IBDP)

⁸ American Advanced Placement program (AP)

⁹ International Baccalaureate (IB)

Method

Semi-structured interviews were used to explore teachers and students' academic emotions under the current international high school curriculum policy of China. The Teacher Emotions Scale (TES) (Frenzel et al., 2016) was revised to study science teachers' teaching emotion (see the questionnaire in Appendix 1). The Achievement Emotions Questionnaire (AEQ) (Pekrun, 2006) was revised to investigate students' learning emotion towards science classes (see the questionnaire in Appendix 2). As stated by Frenzel et al. (2016), this scale yields a reliable and valid measurement of the research, and ensures the cross-linguistic equivalence. Furthermore, the results of the study by Pekrun (2006) showed the reliability, internal and external validity of the AEQ¹⁰ in terms of three dimensions: the value of students control-value assessment, academic and academic performance. Teachers, students and their parents were consent informed before conducting the interview. Each interview was around 30 minutes and was audiotaped. Additionally, due to current COVID-19 pandemic situation in both the Netherlands and China, semi-structured interviews were conducted online.

Participation and Procedure:

Four teachers and eight students were selected from SIPFLS-school¹¹ for interviewing. There were two chemistry teachers (one with a master degree from Soochow University in China and the other with a master degree from the University of Liverpool in the UK) and two biology teachers (one with a master degree from Soochow University in China and the other with a master degree from the University of Nottingham in the UK). All of them teach Year 11 Science courses (Chemistry and Biology) in this school. One outstanding student and one low academic

¹⁰ Achievement Emotions Questionnaire (AEQ)

¹¹ Suzhou Industrial Park Foreign Language School [SIPFLS]

level student from each class were expected to join this study voluntarily. Four students came from Year 11 IB¹² classes, and the other four students were from Year 11 AP¹³ classes.

Data analysis method

The data analysis in this study follows the method of descriptive qualitative research. This is because descriptive qualitative research method is where the researcher comprehensively summary the general experience of an event from individuals' description; moreover, this qualitative research method least bound by prior theory, which claims to investigate the most natural academic results in the context of the research field (V. Lambert & C. Lambert, 2012). In this research, first of all, the audiotaped data was transferred into transcripts. The Chinese transcripts were translated into English and the translations were checked by the other two researchers. And all data analysis is completed in qualitative data analysis software, Atlas.ti. Secondly, the research followed the three-step coding procedure, that is open coding, axial coding, and selective coding (Johnson & Christensen, 2014).

Open coding and axial coding

In terms of teachers' studying, in the procedure of open coding, all transcripts were read, and useful words were labeled. In this process, I use emotion coding, concept coding, value coding (Miles et al., 2019), and prior coding (Stefaniak, 2019). Miles et al. (2019) also mentions that there are three types of related codes for values coding, which take into account the participants' values, attitudes and beliefs, each of which stands for their view or worldview.

The second cycle of coding is axial coding. In the process of data analysis, I analyze data according to my research question: science teachers and students experience academic emotions under the current international school's policy China. I grouped the codes created in the first

¹² International Baccalaureate (IB)

¹³ American Advanced Placement program (AP)

cycle as code groups. In addition, I conducted a member check. I cross-referenced the analysis and interpretation of participant interview data with each transcript. This technology-supported device was used to improve the accuracy, credibility, effectiveness and transferability of research (Thomas, 2016). Then, I categorized code groups into code categories. In the last cycle of data analysis, I have summarized the codes and themes of the first two cycles into general patterns. The first coding cycle and the second coding cycle of analyzing students' interview transcripts are the same as the analyzing processes of teachers.

Selective coding

Thematic analysis is a common method for selective coding. Thematic analysis is used to identify themes in research findings (Johnson & Christensen, 2014). In the third cycle of the selective coding process, I used the open codes, code groups, and axial codes generated in the first two steps of the analysis process to develop general themes. Considering the purpose of this study, after many times of coding, I have concluded how science teachers and students experience academic emotions in the context of international schools in China, as well as their perceptions and recommendations on the management policies and curriculum policies of international schools. Due to the tedious data analysis, in the Finding section, I will directly quote the text from the transcripts to visualize the conclusions.

The completed data was presented in the following tables. Table 1 illustrates science teachers' teaching emotions under the context of international school policies. Table 2 demonstrates science teachers' perspectives on current international education policies. Table 3 illustrates students' learning emotions under the context of international school policies. Table 4 demonstrates students' perspectives on current international education policies.

Table 1. *Science teachers' teaching emotion*

Core categories	Code groups	Open codes	T1	T2	T3	T4
			Yes (Y)			
Feeling enjoyment	Students bring enjoyment to teaching/in action	• Feeling a sense of accomplishment on students' good performance	Y			
		• Students are interested in biology and curious to discovering knowledge			Y	
		• Feeling happiness because of seeing students being inspired			Y	
		• Feeling happy because students are interested in the subject			Y	
		• Feeling happy because of the respect of the students				Y
		• Teacher feels happy when students immediately understand the teacher's explanation		Y		
		• Feeling happy with students and colleagues	Y			
	Teachers' views on teaching/on action	• Satisfied as a teacher	Y			
		• Knowing different students and discovering students' potentials			Y	
		• Feeling happy for explaining the knowledge clearly in class				Y
		• Feeling happiness because of sharing knowledge with students		Y		Y
		• Confidence in own professionalism			Y	
		• Prefer being a teacher				Y
Feeling anxiety	Students' learning process	• Feeling frustration and anxious student against get into a learning state			Y	
		• Feeling frustrated students' not focus on study			Y	
		• Worrying students will lose interest in biology because it is too difficult		Y		
		• Worrying about students can't keep up	Y			
		• Worrying about students failing to understand the intention of class activities		Y		
		• Worrying that students are not developing the skills they need to learn in the class		Y		
		• When recalling the course there is a concern that students are not understanding the course				Y
	Students' mutual cooperation in class	• Students sleeping in class and not completing their homework		Y		
		• Feeling anxious due to students' non-cooperation in class		Y		
		• Feeling afraid of quiet class	Y			
	Students' performance	• Feeling anxious about students' performance		Y		
		• Worrying students' performance on internal assessment essay especially designing experiments	Y		Y	
		• Worrying students cannot meet academic demands			Y	
		• When the test is coming there is still some pressure				Y
	Prerequisites for optimal teaching	• Worrying about failing to carry out class activities		Y		
		• Feeling difficult to teach students with no basic knowledge of chemistry but learn it in English				Y
		• Feeling anxious about students' English proficiency				
Feeling angry	Students' performance	• Feeling frustrated on students' performance on exam	Y			
		• Feeling frustrated on students don't understand in class	Y			
		• Feeling frustrated when students' academic performance significantly differs from the teacher's expectations	Y			
	Classroom management	• Angry due to student disruptions in classes		Y		
		• Naughty students and difficult on managing order in class				Y
		• Getting annoyed about teaching classes with more than 20 students				Y

Notes: T1 = Chemistry teacher with Chinese educational background; T2 = Biology teacher with Chinese educational background; T3 = Biology teacher with British educational background; T4 = Chemistry teacher with British educational background; Yes = The teacher mentioned this idea.

Table 2. *Science teachers' perspectives on current international education policies*

Core category			Code group	T1	T2	T3	T4
				Yes (Y)			
International curriculum philosophy	Positive	•	Positive view on easy to gain good results				Y
		•	International schools are willing to listen to student voices	Y		Y	
		•	Small class size teaching			Y	Y
	Negative	•	Students’ weak English proficiency		Y		
		•	Less course options for students		Y		
		•	Conduct interdisciplinary curriculum	Y	Y	Y	Y
		•	Internationalization philosophy		Y	Y	Y
Develop students’ abilities	Positive	•	International curriculum develops students’ various abilities (Self-learning/critical thinking/communication/leadership) and interests	Y	Y	Y	Y
		•	Students at international schools are more motivated to learn	Y	Y		Y
		•	Students choose courses based on their strengths and future demands	Y	Y		Y
		•	Applying to universities is not based on exam results only				
		•	Teaching material benefit for teaching	Y	Y	Y	Y
Teaching resources	Negative	•	Inadequate laboratory facilities in schools make it difficult to conduct science lab classes		Y	Y	Y
		•	Not very professional teacher	Y		Y	
		•	Teaching material hinder for teaching				Y
		•	Demands highly autonomy students	Y	Y		
Students’ Autonomy	Negative						

Notes: T1 = Chemistry teacher with Chinese educational background; T2 = Biology teacher with Chinese educational background; T3 = Biology teacher with British educational background; T4 = Chemistry teacher with British educational background; Yes = The teacher mentioned this idea.

Table 3. Students' learning emotion

Core categories		Code groups		Open codes		S1	S2	S3	S4	S5	S6	S7	S8	
						Yes (Y)								
Feeling enjoyment	Yes	Intrinsic motivation	•	Chemistry develops self-studying skill, therefore, feeling enjoyment to study chemistry	Y									
			•	Willing to participate in class activities because of the desire to understand the nature of subject										
			•	Enjoy studying because of interest					Y					
			•	Participating class-activity gives a better understanding, therefore, enjoying being involved in class activities	Y	Y	Y	Y	Y		Y	Y		
			•	Enjoy participating in activities because activity increases interest in learning	Y		Y				Y	Y		
		Teacher's support	•	Enjoyment because the subject is related to future development					Y				Y	
			•	Asking teacher questions in class freely, therefore, feeling enjoyment to study	Y									
			•	Enjoy studying chemistry because of a patient teacher					Y					
			Pre-cognition of this subject (students' belief)	•	Consider the subject knowledge is easy to learn and enjoy participating in class activities			Y		Y				
				•	Enjoy participating in class activities as long as it is not a disliked subject			Y						
•	Enjoy participating in subject-related activities because of interest						Y			Y				
•	As long as listening carefully, it is possible to answer the teacher's questions correctly, therefore willing to answer questions in class						Y							
Feeling pride	No	Pre-cognition (students' belief)	•	Don't enjoy doing chemistry experiments because of fear of doing them						Y				
			•	Don't enjoy chemistry because of the complexity of professional vocabulary					Y					
	Yes	Intrinsic motivation	•	Learning is for the exam and not because of like							Y			
			•	Feeling a sense of accomplishment because of good results			Y							
		Proud of outcome achievement (Extrinsic Goal Orientation)	•	Feeling of accomplishment when answering questions correctly			Y	Y						
			•	Feeling a sense of accomplishment because keeping up with the teacher's progress.			Y		Y			Y		
			•	Answering the questions correctly means mastering the knowledge, so there is interest and pride in learning					Y					
			•	Believe that learning in class is important, so they feel proud to understand the lesson						Y				
		Proud of exceed expectation	•	Proud of getting a good score in the exam because of answering questions correctly					Y					
			•	Feeling a sense of accomplishment in learning biology because of fragmented knowledge of biology understanding					Y					
•	Feeling a sense of accomplishment when fully understood because do not good at							Y		Y				
•	Feeling a sense of accomplishment after understanding because of the difficulty of knowledge								Y	Y				
Feeling anxiety	Yes	Proud of self-efficacy	•	Feeling a sense of accomplishment once expectations are exceeded								Y		
			•	Feeling proud, because answering the question correctly is an affirmation for myself							Y	Y		
		Alignment with self-expectations	•	Answering the questions correctly will be praised by the teacher, which is a motivation for learning					Y					
			•	It is normal to learn what the teacher explains in class, therefore do not feel proud	Y			Y			Y			
			•	Previewing more difficult questions	Y									
	Yes	Feeling tension and frustrated	•	Afraid to answer for fear that the answer is wrong				Y				Y		
			•	Feeling frustrated because of not remembering the knowledge								Y		
			•	Feeling frustrated if answering questions incorrectly						Y				
		Feeling worry	•	Feeling frustrated because of unsatisfactory academic performance								Y		
			•	Feeling frustrated because of not keeping up with the teacher's teaching progress									Y	
Yes	Feeling worry	•	Anxiety because English will hinder understanding								Y			
		•	Anxiety is caused by don't understand the lesson						Y					
		•	Feeling nervous when contacting brand new knowledge and not understanding it					Y						

Feeling hopeful	No	External assistance	• When not understanding the lesson, anxiety is caused by the fear of not understanding the next knowledge.						Y	Y		
			• Refusing to answer because of inner fear								Y	
			• Nervous because of exams								Y	
			• Anxiety for fear of failing the exam								Y	
			• No anxiety because the teacher's notes are clear					Y				
			• Professionalism of teachers can reduce students' anxiety about exams					Y	Y			
			• Experiments make learning biology easy	Y				Y				Y
			• Don't feel anxious because other materials can be consulted when don't understand					Y				
			• A relaxed class atmosphere, which in turn does not create anxiety to study	Y	Y			Y	Y			Y
			• Since there is no exam, just master the knowledge explained by the teacher in class, therefore, don't feel nervous					Y				
	Yes	Extrinsic Goal Orientation	• Don't feel nervous because it is possible to answer the questions asked by the teacher correctly.							Y		
			• Don't be nervous about answering questions because of know the answer							Y		
			• Believe the answer given by self is correct							Y		
		Self-identification	• Don't feel nervous, and keep studying chemistry even answer wrong in class, because spending more time on self-study to master knowledge after class	Y								
			• As long as study hard it can be understood and anxiety can be eliminated							Y		
			• Motivated to learn even if incorrect answer is given	Y								
		Intrinsic goal orientation	• Answering questions incorrectly means keep studying hard					Y				
			• Don't refuse to answer questions because of anxiety due to wrong answers					Y				
			• Don't refuse to answer questions because the teacher will not blame for a wrong answer					Y		Y		
			• Believing that spending more time to study will definitely learn the course well, therefore, it does not feel that there is hopeless to learn science well	Y	Y			Y	Y			
	No	Intrinsic motivation	• As long as studying hard, good performance will be achieved, therefore, it does not feel that there is hopeless to learn biology well					Y			Y	Y
			• As long as following the teacher's steps, it is hopeful to learn biology well					Y				
			• The content of the teacher's lesson can be very relevant to the test; therefore, it is hopeful to learn biology well						Y			
		Hopeful and External assistance	• The teacher's lectures are logical and clear; therefore, it is hopeful to learn biology well.						Y			
			• Don't feel anxiety because the teacher slows down the speed of the lecture								Y	
			• It is possible to ask the teacher what is unknown and to solve problem, therefore, it is hopeful to learn well					Y				
		Pre-cognition of this subject	• Hopeful because of the help of classmates							Y		
			• Don't feel hopeless because other materials can be consulted when don't understand							Y		Y
			• Although individual problems are difficult, but there is hope for learning biology	Y								
			• Consider chemistry knowledge is easy to learn							Y	Y	
	No	Gap between because of teacher's teaching and students' comprehension	• Don't feel hopeless about studying chemistry because it's easy to achieve good results							Y		
			• Simple questions are hopefully to understand									
			• Having confidence to learn biology									Y
			• Feeling hopeful about learning biology because of solid foundation of biology knowledge									Y
	No		• Feeling hopeless about studying chemistry because some problems are still not understood after teacher's explanation								Y	

Notes: S1 = Excellent IB Chemistry student; S2 = Excellent Biology AP student; S3 = Upper-middle Biology AP student; S4 = Excellent AP Chemistry student; S5 = Upper-middle IB Chemistry student; S6 =Worse AP Chemistry student; S7 =Worse IB Biology student; S8 = Excellent IB Biology student; Yes = The teacher mentioned this idea

Table 4. *Students' view and suggestion towards international schools' policy*

Core category			Code group	S1	S2	S3	S4	S5	S6	S7	S8
				Yes (Y)							
International curriculum philosophy	Positive	•	Less pressure at international high school		Y		Y				
		•	More course options	Y				Y	Y	Y	
		•	International schools are willing to listen to student voices			Y		Y	Y	Y	
	Negative	•	Insufficient course selection change students' future plan		Y						
		•	School's course is only enough for exam, loss motivation	Y							Y
Develop students' abilities		•	International school curriculum enhances students' abilities	Y					Y	Y	
		•	International school curriculum prepares students' future studies	Y		Y		Y			
		•	International schools' grouping teaching method		Y						
Learning resources	Positive	•	International school teachers are professionals		Y		Y				
		•	School provides practice materials and self-made slides for students				Y				Y
		•	School provides experiments for students		Y			Y		Y	Y
	Negative	•	Less opportunity for experiments			Y	Y		Y		
School time schedule	Positive	•	International school schedule time reasonable	Y							
	Negative	•	International school schedule time unreasonable	Y		Y	Y		Y		Y

Notes: S1 = Excellent IB Chemistry student; S2 = Excellent Biology AP student; S3 = Upper-middle Biology AP student; S4 = Excellent AP Chemistry student; S5 = Upper-middle IB Chemistry student; S6 =Worse AP Chemistry student; S7 =Worse IB Biology student; S8 = Excellent IB Biology student; Yes = The teacher mentioned this idea

Results

For this study, I divided into four modules to measure and interpret my five sub-research questions: teachers' emotion, teachers' attitudes towards contemporary international education policies, students' emotion, and students' attitudes towards contemporary international school policy. I refer to individual teachers as teacher number one (T1), individual students as student number one (S1), and so forth.

Teachers' teaching emotion under contemporary international schools' policy

Based on the TES, three teaching emotions of Chinese international schools' science teachers in the teaching process, which were enjoyment, anxiety, and anger were measured.

Enjoyment

There are two main categories that contribute to teachers' enjoyment of teaching: teachers' views on teaching (on action) and students bring enjoyment to teaching (in action).

On action. On action means that the enjoyment of teaching is due to the teachers' enjoyment he/she preparation of the teaching processes teaching process. For example, "I can learn more knowledge, get to know different students and discover their different potentials. Then I can help each student to find their own appropriate method of learning, which is also very satisfactory" (T3).

In action. For in action, students and colleagues bring enjoyment to teachers. One teacher says that "[...] when a student achieves good results in the IB-exams, or when a student is accepted to one of the top universities in the world, or when a student wins a prize in a competition. [...] I feel a sense of achievement as a teacher" (T1). Teachers also appreciate being a teacher when "students are interested in the subject" (T3) they are teaching or when students are "inspired" (T3) by their lessons.

Anxiety

For teachers' anxiety about teaching, it has five categories: teachers anxious about students' learning process, anxious about students' mutual cooperation in class, students' performance, and prerequisites for optimal teaching.

Students' learning process. Teachers concerns about students' learning process are mainly reflected in the way that teachers worry about students who are not in a “good state of learning” (T1), they “lose interest in the subject” (T2), they “do not keep up with the speed of teaching schedule” (T1), they “do not understand the intent of class activities” (T2), and they “do not practice skills that they should be allowed to develop in class” (T2). The teacher also worries when recalling lessons afterwards about “whether the students have understood what I have said in class” (T4).

Students' mutual cooperation in class. Teachers could become anxious because students were “not cooperating” (T2) with their teaching. For example, “some students sleeping in class and not completing their homework” (T2).

Students' performance. Students' performance creates anxiety among teachers mainly because teachers are worried about students' academic performance, such as the experimental design of students' IA essays¹⁴, and about students' test results.

“[...] when students are writing their Internal Assessment (IA) papers, [...] I would be a little more anxious” (T3).

Prerequisites for optimal teaching. Teachers may also worry about the prerequisites for teaching, such as the “students' interests” (T2), “students' background knowledge” (T4), and “students' English proficiency level” (T2).

¹⁴ Internal Assessment (IA)

Teacher self-efficacy. When teachers are at low self-efficacy, they suffer from anxiety about their teaching. When their self-efficacy is constructed, their teaching anxiety disappears, and they become confident and enjoy the career. Taking one teacher's perspective for instance, "when I first became their teacher, I had just graduated with a master's degree, and I was not very familiar with teaching. So, at the beginning, when I was teaching them, I might feel some anxiety. But as time went on, I felt that I was growing, including my understanding of the subject, the anxious experience slowly fades away [...] so, I don't feel too anxious, but I feel enjoyment to this job." (T4).

Angry

Students' performance. Teachers feel a sense of frustration on two indicators. The first one is that even though teachers try their best to teach, students still cannot understand. Taking one teacher's statement for example "sometimes I get really angry and frustrated when I have to explain the same inquiry to them over and over again" (T4). The second one is about when students' results differ significantly from the teacher's predicted grades. For example, "when the students' performance differs significantly from my expectations, this is also a little frustrating" (T1).

Classroom management. Teachers could also get angry about managing students' classroom behavior. For example, "junior high school students are also naughty, so there are times when they are rather annoying in terms of managing order in class" (T4).

Teachers' attitudes towards contemporary international school policy

During the interview, three teachers indicate that they hold a neutral attitude toward international education in China. Although their attitudes were neutral, they were not indifferent to it. The

remaining teacher has a positive attitude. Table 5 shows the teachers' teaching experience, educational background, and attitudes toward international education.

Table 5. *Teachers' general attitudes towards contemporary international education policy*

	T1	T2	T3	T4
Teaching experience	10-year experience	14-year experience	10-year experience	1-year experience
Educational background	Domestic B.S. (Chemistry) & MSc. (Chemistry)	Domestic B.S. (Biotech) & M.Ed	Overseas B.S. (Biotech) & M.Ed	Overseas B.S. (Chemistry) & MSc. (Chemistry)
Subject	Chemistry (IB ¹⁵)	Biology (AP ¹⁶)	Biology (IB)	Chemistry (AP)
Attitude	Neutral	Neutral	Neutral	Positive

As seen from Table 2, regardless of the teachers' experience (expertise or novice) and academic background (domestic or overseas), they have different focus on international school policies. The main concerns about international school policies are: international education philosophy, competency-based curriculum, school resources, and student autonomy. Appendix 3 is the themes of teachers' attitudes towards international curriculum, such as competency-based curriculum, implementation of interdisciplinary course, teaching resources, international education philosophy, and students' autonomy.

International curriculum philosophy

Teachers believe that international schools should provide students with an international teaching environment that will prepare them for higher education in Western universities (Liu, personal communication, May 23, 2022). However, in international schools in China, the international teaching environment is merely cosmetic, with "small class sizes" (T3 and T4), as well as the comparatively democratic teaching, which is also a factor of the competency-based curriculum (i.e., Centrality of the Learner curriculum). For example, "I think the development of

¹⁵ International Baccalaureate (IB)

¹⁶ American Advanced Placement program (AP)

a subject, or a school, or a program, actually needs to listen to the voice of the students. After all, they are the first beneficiaries, so they have the right to speak” (T1).

However, the few course options that schools offer to students in fact hinder interdisciplinary teaching. For example, “biology often needs to be combined with geography, but in our school, there is no geography subject” (T3), therefore, the lack of geography offered in schools prevents the process of interdisciplinary teaching.

In fact, international schools only “introduce the original British or American teaching materials” (T2, and T3), and the “working language is still Chinese” (T3). The school also offers very few extracurricular activities for students that are internationally relevant (T4). Nevertheless, the “weak English proficiency of students” (T2) is also a significant underlying factor that hinders international education.

Competency-based curriculum.

From teachers’ opinion, international schools in China develop students’ abilities in a multitude of areas. They have been implemented well in terms of one of the elements of competency-based curriculum (i.e., competency-based Curriculum). Taking one teacher’s statement for instance, “this is good for improving students’ autonomy” (T2). Additionally, students at international schools can select courses based on their “future university program requirements and their interests” (T1, T2 and T4). Moreover, “university applications are not based only on the student’s final exam results, but on the student’s overall performance” (T1, T2, T3 and T4). This makes “students more motivated to study” (T4).

The curriculum of international schools in China also embodies another element of a competency-based curriculum (i.e., teacher as a facilitator of learning). This means that the

teacher leads and assists students in the learning process to complete the learning tasks and acquire relevant competencies (Priestley & Sinnema, 2014).

“Students in CAS¹⁷ classes can do social projects led by their supervisors to develop their organizing and leadership skills. In EE experiments, students are also led by their supervisors to do independent experimental research projects to hone their research skills” (T3).

Teaching resources.

In terms of teaching resources at international schools, teachers say that the “official textbooks” (T1 and T3), “reference books” (T2 and T4) and “curriculum syllabi” (T1, T2, T3, and T4) are sufficient for them to help students prepare for final official exams. However, one teacher says that “the reference textbook is very detailed, but there are few accompanying exercise books. The AP officially provides us with a ‘question bank’ called ‘AP classroom’, which contains a large number of reference teaching videos and accompanying exercises. But I think it is not enough” (T4)!

Not very professional teacher resources in international schools are also one of the major factors that obstruct the development of international education in China. For example, “there are some teachers that do not meet - I personally think so - the standard, especially some foreign teachers. And they are often complained by students, and parents. This brings big difficulties for school normal teaching” (T1). Additionally, the “not very professionalism of some subject teachers” is an obstacle to interdisciplinary teaching (T3). As one teacher mentions that “the laboratories at my current school are completely inadequate for my possibilities of conducting experimental teaching” (T4).

¹⁷ Creativity, Activity, Service

Students' weak autonomy

Learning in international schools is different from public schools under the Chinese domestic education framework as it is “less pressure to learn” (T1 and T4). For example, “the IB¹⁸ syllabus requires the teacher to revise the IA essay¹⁹ for students only once. [...], very few students can write their IA essays to the satisfaction of the teacher after the teacher has revised their essays once. [...] So, the autonomy of Chinese students is still lacking.” (T1). Moreover, students' weak autonomy brings difficulty for teachers' class management. For instance, “when students are designing and learning on their own, I sometimes can't keep track of whether they are paying full attention or spending their time on the projects I need them to design, or on their work” (T2).

Students' teaching emotion under contemporary international schools' policy

Based on AEQ²⁰, four learning emotions of Chinese international school students during class, namely, enjoyment, pride, anxiety, and hopeful were measured. The analysis of transcripts shows that teachers' educational background (traditional or international) has little influence on students' learning emotions.

Reason for students select course

The interviews revealed that students chose the subject (biology or chemistry) as their science option for several reasons: firstly, they were “interested in the science subject” (S4). Secondly, they believe that they would be able to “perform better in the subject than in another course” (S8). Thirdly, depending on their performance in middle school. For example, “through the study of biology in junior high school, I found that I was good at it” (S8). Fourthly, they think that the course they are taking is related to their future major. For example, “My target

¹⁸ International Baccalaureate (IB)

¹⁹ Internal Assessment (IA)

²⁰ Achievement Emotions Questionnaire (AEQ)

major when I entered university was psychology. At first, I learned that the knowledge of psychology is related to the knowledge of biology” (S7).

Therefore, it can be seen that students choose biology or chemistry courses mainly because of their interest. However, due to the full English language teaching of the international programs and the difficulty of the courses, other negative emotions such as anxiety and hopelessness may arise during the school process. The following is the analysis of students’ learning emotions.

Enjoyment

Three elements unfold the enjoyment of learning in students: the intrinsic motivation, teacher’s support, and their pre-cognition of the subject.

Intrinsic motivation. Intrinsic motivation means engaging in an activity for intrinsic satisfaction, not for some extricable outcome (Oudeyer, 2007). According to interviews, the intrinsic motivation is the primary factor that influences students’ enjoyment of learning science.

“My love for biology actually comes from my love for psychology, because I know that I will use my knowledge of biology when I study psychology in the future” (S7).

Most of the students enjoy participating in science class activities, such as experiments. This is because class activities allow them to understand the “essential” (S7) of the knowledge, and assist them to “enhance interest” (S8) in science. By contrast, when students lack the intrinsic motivation, they also create the emotion of non-enjoyment of learning the subject. For example, “I didn’t really like chemistry. [...] I studied chemistry just to finish the exam” (S6).

Teachers’ support. The support of teachers is also one of the most important factors for students to enjoy learning this subject. The teacher’s patience when students have questions that they do not understand, as well as the willingness to answer them at any time, can increase

students' enjoyment of learning. To illustrate "I find the chemistry course is interesting [...]. My teacher is also very patient with me" (S4).

Pre-cognition of this subject. Students' pre-cognition can influence students' enjoyment in the subject as well. For illustration, one student says: "I also really like to participate in experiments in class because I can connect what I have learned by conducting experiments. I think it's funny" (S3). Another girl says, "I participated in some class activities and biology competitions, because I liked this subject" (S7). However, pre-cognition is also the reason why students dislike this subject. One student says: "I prefer chemistry in Chinese to chemistry in English. I think chemistry professional terminology is too complicated" (S6).

Pride

The results of the interviews indicate that there are three feelings that make students feel proud of themselves: the student achieved a satisfactory outcome, the student achieved a sense of self-efficacy, and the students' achievement goes beyond his or her expectations.

Proud of outcome achievement. One boy says: "I can get a good result after I have completely mastered the contents provided by my teacher. I can also handle mid-term and final biology exams easily. So, I have a sense of achievement" (S2). Another boy mentions that "being able to learn the knowledge my teacher taught [...] will [...] benefit my major study in university" (S4). Consequently, students feel pride when they realize that they may get good results in their future exams or in their future major studies.

Proud of self-efficacy. The next category for students' pride is that students feel they have been recognized by their teachers. For example, "I felt a sense of pride when I solved the problem [...] and was certified by the teacher's authority" (S8). Teacher acknowledgement is also one of the reasons why students feel proud and acquire self-efficacy, for example, "most of

my motivation to learn chemistry comes from the teacher's praise. Answering questions correctly makes me more confident" (S4).

Proud of exceeding one's own expectation. Students acquire a sense of pride when obtaining results that are higher than their expectations. For example, "if the exam results exceed my expectations, I will also be satisfied and proud" (S8). Conversely, students do not feel proud when the results they obtain are either parallel (S3) or lower than their expectations (S1).

Anxiety

There are two types of emotions that enhances students' learning anxiety. One is on the affective level, and the other is on the cognitive level.

In terms of affective level, there are two emotions: tension and frustration. Sometimes students would be reluctant to answer teacher's questions even if they know the answers because they are tense. For instance, "sometimes I do already know the answer, but I'm afraid my answer will be wrong, so I might wait until other students have posted their answers before I post my answer" (S7). Students would also feel frustrated during class, for example, "when the teacher asks me about the knowledge I did not remember firmly. It can be a bit frustrating at that time" (S8). When it comes to cognitive level, students may worry about not being able to understand future knowledge "because the old knowledge is not yet understood, and the next one will be taught" (S5).

However, external assistance, such as "teacher's clear instructions" (S3), "science experiments" (S3), and other "online reference materials" (S1) can alleviate students' anxiety in learning. In addition, students' sense of self-identity and intrinsic goal orientation help them to alleviate learning anxiety.

“When it comes to speaking up, I don’t have to worry about it. [...], I am sure that I am not just guessing my teacher’s question, I must have some logical inference, so I feel that my answer is reliable” (S8).

“I strongly disagree that I can feel anxiety [...] answering the questions wrong would make me feel that I didn’t have a good mastery of the knowledge at this stage, and I need to continue [...] to correct my misunderstanding in this area” (S2).

Last but not least, students are unlikely to become anxious about learning without the extrinsic goal oriented. As one boy says, “because there is no pressure of exams [...] So, I won’t be particularly nervous” (S2).

Hopeful

There are four leading factors that lead students to feel that learning science is hopeful. The first factor is students’ intrinsic motivation. They believe that it is possible to do well in science courses if they make the effort to study. For example, one boy says that “What I don’t understand will eventually be clear if I spend more time to learn” (S1). The second factor is external assistance, such as keep up with teachers’ lessons, teachers’ assistance, classmates’ assistance, and learning materials. As one boy says, “first of all, my teacher’s lecture is very logical and clear. Secondly, even if I don’t understand contents of a lesson, I can ask my classmates for help, and I can review my teacher’s slides by myself. I can also go to the Internet and check the resources to continue learning.” (S3). Therefore, external assistance can release students’ hopeless emotion.

Pre-cognition of this subject is not only one of the factors that enable students to enjoy learning, but also it is one of the elements that create hopeful emotion for them to learn the subject. For example, “there is nothing particularly difficult to understand about the content that

we are learning now. It's all pretty easy to understand. If I do more practice, I am sure I can understand it. I wouldn't say there's no hope to understand chemistry" (S4).

The last factor that causes students to feel that their learning of science is hopeful is their knowledge background. As one girl says, "I have a certain basic knowledge of junior high school biology [...]. Therefore, it is not difficult to learn biology until high school" (S8).

Nevertheless, once the students' understanding deviates from the teacher's explanation, the students will feel that learning is hopeless. For example, "when there are some parts that my teacher has talked about many times and I still don't understand them, I will feel hopeless and give up" (S6).

Students' attitudes towards contemporary international school policy

Only one girl holds a negative attitude towards international education policy, while the remaining seven students have a positive attitude. Due to the students' short insight, however, they only described the current policy for their school. Table 6 records the students' academic position, and which classes they are studying in.

Table 6. *Students' general attitudes towards contemporary international education policy*

	S1	S2	S3	S4	S5	S6	S7	S8
Class	IB ²¹	AP ²²	AP	AP	IB	AP	IB	IB
Teacher	T1	T2	T2	T4	T1	T4	T3	T3
Subject	Chem	Bio	Bio	Chem	Chem	Chem	Bio	Bio
Academic position	E	E	U	E	U	W	W	E
Attitude	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Negative

Notes: S = student; Chem = Chemistry; Bio = Biology; T = teacher; E = Excellent; U = upper -middle; W = Worst;

Table 4 shows that students' main concerns about international school policies are: the international concept of the curriculum, whether it is competency-based, the reasonable

²¹ International Baccalaureate (IB)

²² American Advanced Placement program (AP)

scheduling of the school's curriculum, and the adequacy of learning materials. Appendix 4 is the themes of students' attitudes towards international curriculum.

International curriculum philosophy

As Zhang (personal communication, May, 24, 2022) indicates that the majority of students who enter international schools are unable to study in a Chinese public high school because of their academically underperformance in middle school. Their goal is to go to university abroad in the future by studying international programs. Therefore, they are more concerned about whether the curriculum philosophy is sufficiently internationalized. In the traditional Chinese mindset, we believe that the Western classroom is represented by the words: low pressure, democracy, freedom, and focus on the development of students' abilities. Through the analysis of transcripts, it is clear that students' understanding of the three traditional conceptions of the western classroom are reflected in: less pressure at international high school, democracy of the curriculum, more (or less) course options, and developing abilities. The developing abilities will be elaborated on in the next theme (i.e., competency-based curriculum) that the students mention. Following are three examples that illustrate each of these three viewpoints.

“We do not have a lot of pressure to study” (S4).

“[...] the school is very democratic and the teachers are willing to listen to students' opinions to improve the curriculum” (S3).

“[...] the school offers us different kinds of second language courses that also promote our understanding of different cultures” (S7).

Although the school offers a wide range of course selections for students, some students still say that the school should offer some subjects relevant to their future development. Taking

one girl's statement for instance, "[...] IB²³ authority requires IB schools to provide psychology courses for their students. However, our school does not offer a psychology course. [...]. For me, it might be missing some courses that I want" (S7). In addition, the school's insufficient course options have even resulted in some students having to forced their students "to give up my dream university and major" (S2).

There is no denying that international schools in China are in the context of Chinese education and that the curriculum system is bound to be influenced by Chinese education system. As one student mentions: "the advantage is that we are able to master the knowledge in the textbook. It can be helpful for our future exams. The disadvantage is that the difficulty of the knowledge explained by the teacher is too low, which will reduce our motivation for learning" (S8). This indicates that the philosophy of education in Chinese international schools is still, to some extent, exam-oriented.

Competency-based curriculum

Teachers mention that the international school curriculum is one that develops students' abilities in all areas. By analyzing students' interview transcripts, this view is shared by the majority of students. For example, "a course in visual arts would probably help me a bit more. It would be better for developing my creativity" (S6), and "the teacher also focuses more on the development of students' critical thinking in class" (S1). Students also note that the international school curriculum prepares them for their future university studies. A good case in point is "the school has provided me with knowledge in mathematics and physics that will help me later when I learn my major in the university" (S1).

In addition, the school also utilize a grouping approach to teach that is to say, "students who are able to take the AP exam and those who are less able but are very interested in a

²³ International Baccalaureate (IB)

particular course are divided into two classes. This ensures that students who want to take the exam are able to study at a higher level of difficulty, while improving the GPA scores of other students” (S2).

Learning resources

For learning resources, students mainly focus on three areas, namely professionalism of teachers, learning materials provided by school, and science experiments. In terms of the area of professionalism of teachers, students mention that “teachers are well-trained professionals” (S3), “teachers not only teach me knowledge, but also teach me the solutions to problems I will encounter later in university” (S4).

When it comes to the area of ‘learning materials provided by school’, student says “the teachers give students more exercises to practice, which also allows students to understand the knowledge by doing the exercises” (S7). Furthermore, teachers also provide students with “class slides written by themselves” (S3) so that students can do self-review after class. This reflects one of the elements of the competency-based curriculum that is “teacher autonomy”, which means teachers have right to make their own decisions concerning their teaching (Priestley & Sinnema, 2014).

Apart from this, as one girl mentions “Experiments can assist me in learning and can enhance my interest in learning, which enables learning biology easier” (S8). This demonstrates that the school provides opportunities for students to conduct science experiments. However, some students indicate that “my school provided me with too few lab courses, such as chemistry” (S5). Therefore, in order for students to have a thorough understanding of science theory, more science lab courses should be offered in the school.

School time schedule

Most students say that the school's time schedule is unreasonable, either in class time duration or in class hours. There are two students who mention that "some classes may be too long (75mins), I think it is not in line with a person's concentration level" (S4 and S6). Furthermore, "the lunch break is too short" (S1). Other students point out that the "the amount of class time set for each subject at our school is too limited" (S3), which is not conducive to revision before exams. However, "school schedules six sessions a day, which is quite reasonable for a student" (S1).

Conclusion and Discussion

Teachers' teaching emotion and students' learning emotion under international curriculum in China

The above analysis reveals that in the context of international education, teachers enjoy being teachers. The emotions of enjoyment come from their own recognition of the nature of the occupation of being a teacher and the wonderful experience that students bring. However, there are also some negative emotions, such as anxiety or anger. Both anxiety and anger are associated with students' attitudes toward learning (including bad behaviors) and unsatisfactory academic performance. On conclusion, the main factors affecting teachers' teaching emotions are: students' emotions toward learning, students' academic performance, working atmosphere and teachers' self-efficacy.

To begin with, when students' learning emotions are positive, including the willingness to cooperate with the teacher in the class, and willingness to participate in class activities, science teachers would feel that their lessons are inspiring to their students and would enjoy teaching. This demonstrates that science teachers' teaching emotions are the same as mathematics teachers', which are mutually influential on students' learning emotions (Frenzel et al., 2018). Additionally, when students achieve satisfactory academic performance, science teachers will have a sense of accomplishment in their teaching results and, consequently, generate enjoyment in teaching. Vice versa, the teacher would experience anxiety or anger. In other words, when science teachers achieve satisfaction in their teaching, they experience the

emotion of enjoyment of being a teacher. Furthermore, a friendly working environment, including friendliness with colleagues, less teaching stress, and acceptable work other than teaching would also be enjoyable for teachers. Apart from this, science teachers' high self-efficacy enables them to feel confident about teaching and therefore enjoy teaching; conversely, they feel anxious about teaching. These are in line with the finding of Frenzel et al., (2016) with measurement of mathematics teacher.

Compared with teachers' teaching emotion, students' enjoyment and hopeful learning emotions are determined by their intrinsic motivation, external support (teachers, peers, and learning materials), students' prior knowledge on the subject, and students' subject foundations. Their pride and anxiety in learning are mainly derived from extrinsic goal orientation, such as future exam results and future learning. As well as the their per-recognize of themselves, such as self-identity, and pre-judgement of themselves.

The intrinsic motivation of students enables them to feel enjoyable, as well as hopeful about learning the subject. Intrinsic motivation is also one of the most valuable factors in relieving students' learning anxiety. Pekrun et al. (2011) states that

"Emotions are thought to influence students' intrinsic motivation to learn which is based on interest and curiosity in learning" (p.38).

However, it is evident from this study that intrinsic motivation can also influence students' emotions towards learning and they are reciprocal. For example, intrinsic motivation can reduce students' anxiety about learning, and students enjoy learning because of their self-learning abilities developed through learning.

Secondly, same as teachers' teaching emotion, students' self-efficacy expectation can also affect their emotions about learning. By way of example, students may feel pride when they

feel that their learning outcomes have exceeded their expectations, but not when the outcomes are equal to or lower than their expectations. According to Pekrun et al. (2011), anticipated outcome emotions, associated with potential successes and failures, are perceived to arise in the absence of control, connoting uncertainty about the outcome of these achievements, and the subjective importance of these outcomes. “Hopeful”, “pride”, and “anxiety” are all belonging to outcome emotions (Pekrun, 2006). Besides this, achievement-related emotion (e.g., enjoyment) (Pekrun, 2006) was also related to students’ predictions of self-efficacy. This is because, when students perceive that it is an interesting subject or that the subject is easy to learn, they would enjoy the subject and feel hopeful about learning it, whereas conversely, they would feel hopeless about learning the subject or develop anxiety about learning it.

Thirdly, for Chinese students, extrinsic goal orientation (i.e., to do well in exams) is the most important factor influencing their learning emotions at school. As Pekrun et al. (2011) have noted:

“Extrinsic motivation related to the attainment of positive outcomes (e.g., good grades) or to the prevention of negative outcomes (e.g., poor grades)” (p.38).

Therefore, the findings regarding “extrinsic goal orientation” as a factor influencing students’ learning emotions are in agreement with the previous findings regarding Chinese international school students’ learning of science subjects.

Lastly, external support, such as teachers’ support, peers’ support, and learning material support, is another factor that arises from students’ different learning emotions. For example, during class, teachers and peers’ support can both motivate students to participate in class activities, feel hopeful about the subject learning and ease their anxiety about learning emotion.

In other words, students' activity-related emotions and outcome emotions are moderated by social support. This finding is consistent with perceived social support (Ahmed et al., 2008).

Teachers and students' attitudes towards contemporary international curriculum policy in China

Interviews with the science teachers and students indicated that, the international education policy of most concern to teachers and students is the competency-based curriculum and the teaching resources of school (i.e., range of courses offered, and laboratory facilities). Almost all teachers, regardless of their teaching experience and educational background, and all students, regardless of their academic performance and their teachers' educational background, are interested in this. Teachers also suggested that schools should actively offer interdisciplinary teaching programs, changing educational philosophies from traditional Chinese to international, as well as enhance student autonomy. Students would also like to increase the class hours for examination subjects. This is because they believe that the limited class hours have caused a deficit of revision time and created anxiety for their exams. They also prefer to shorten the duration of a session. The reason for this is that some sessions last 75 minutes, which prevents them from paying full attention to the class.

Competency-based curriculum

The interviews shows that the school offers a wide range of options for students to select from, depending on their interests and future direction, with IB students following the IBO²⁴ requirements and AP students following the US high school graduation requirements. Moreover, the international school curriculum develops students' abilities in various areas. The first element of competency-based curriculum is competency-based, that is, the curriculum develops students' competencies (Tarmo & Kimaro, 2021).

²⁴ International Baccalaureate Organisation [IBO]

Secondly, the school follows the IBO²⁵ standards in the implementation of the three core courses of the IB program, namely TOK²⁶, EE²⁷ and CAS²⁸. The TOK course equips students with the ability to integrate knowledge and understand the coherence of individual subjects; the EE course gives students the opportunity to carry out their own independent experiments and explore knowledge under the guidance of their supervisors; and the CAS course develops students' skills in various areas, such as critical thinking, leadership and communication skills. AP²⁹ students are required by the school to complete these three courses even if they are not required to do so by the CB curriculum organization³⁰. Thus, it can be seen that the school's curriculum aligns with the second element of a competency-based curriculum, that is, teacher as a facilitator of learning, (Priestley & Sinnema, 2014).

The school curriculum also reflects the third element of a competency-based curriculum (i.e., centrality of the learner), which can be defined as students are considered to be at the center of the curriculum design and delivery (Priestley & Sinnema, 2014). This is because international schools are willing to listen to student voices in order to improve the quality of the curriculum and to improve curriculum policies. Aside from this, the small class size of the school teaching method not only ensures that the teachers are able to focus on the development of each student in the class, but also brings the teachers closer to the students. However, there are few opportunities for students to participate in the design of the curriculum and extra-curricular activities.

However, from interviews with these four teachers, it cannot be seen that the international school curriculum met the fourth element of a competency-based curriculum (i.e.,

²⁵ International Baccalaureate Organisation [IBO]

²⁶ Theory of Knowledge (TOK)

²⁷ Extended Essay (EE)

²⁸ Creativity, Activity, Service

²⁹ American Advanced Placement program (AP)

³⁰ College Board [CB]

teacher autonomy), meaning that teachers determine the curriculum autonomously (Priestley & Sinnema, 2014). It is possible that this is because students are required to take high stakes tests (i.e., the IB-exam, and the AP-exam). The school therefore gives teachers less autonomy. However, some students mentioned that because they did not have a set textbook, the teachers would prepare lesson slides, practice materials and other learning materials for students. These learning materials have been prepared and written by teachers themselves. Furthermore, teachers prepare lessons based on students' development demands. These are reflections of another factor of competency-based curriculum (i.e., teacher autonomy). Combining the perspectives of teachers and students, the international school curriculum basically matches so four elements of a competency-based curriculum.

Teaching resources and Interdisciplinary teaching implementation

The science teachers feel that teaching and learning resources in the school were inadequate. It was obvious from the interviews that a major teaching resource issue affecting the teaching of science subjects is that labs are not well equipped. Both biology and chemistry are experiment-based sciences. Students need to identify problems in experiments, solve them and then integrate them with the theory in the textbook to address practical problems. However, the laboratory is not well-equipped, which prevents some biology and chemistry experiments from being carried out. As a result, this deviates from the original purpose of students learning science, which is to combine theory with experimentation. Even though, as one of the teachers says, students can refer to science demonstration experiments on the internet to learn science. However, as another teacher says, students can construct knowledge solidly if they have solved the problems that they encounter in the experiments themselves. Therefore, schools need to

improve the infrastructure of their science labs to ensure that science experiments are carried out properly.

In addition to the lab facilities, a not very professional team of teachers, and an incomplete curriculum to develop, reflect the inadequate teaching and learning resources of the school. These two factors even affect the development of interdisciplinary curricula in the school. Both the IBO³¹ (2017) and the College Board (2000) emphasize the harmonization of subject knowledge and the integrated and comprehensive development of subject. This is because interdisciplinary teaching develops students advanced cognitive ability, not only allows students to understand what they are learning in a multi-perspective way, but also to construct a framework of knowledge by themselves (Repko, 2007). Additionally, teachers generally agree that interdisciplinary teaching facilitates students' understanding of the whole spectrum of knowledge, as subjects are interrelated, rather than independent. However, the a not very professional teaching staff and an incomplete subject setting render the implementation of interdisciplinary teaching difficult.

Although it is not possible to run all the subjects under the IB³² and AP³³ curriculum systems in one school, schools should take into account the views of their teachers and improve their curriculum in a rational way to ensure the carrying out of interdisciplinary teaching as much as possible. Schools should also provide training for teachers on interdisciplinary teaching to enhance their teaching professionalism. This is to ensure the quality of the interdisciplinary curriculum in order to develop students' higher level of critical thinking skills.

³¹ International Baccalaureate Organisation [IBO]

³² International Baccalaureate (IB)

³³ American Advanced Placement program (AP)

International education philosophy

The lack of internationalization of curriculum policies in international schools is the third theme raised by science teachers. The teachers emphasized that the schools they worked in had only changed their textbooks from the Chinese version to the English version, but their teaching philosophy retained traditional Chinese educational ideology, such as an exam-oriented curriculum. This runs counter to the competency-based curriculum theory and does not conform to the application criteria of western universities' admission. Competency-based programs require that all academic performance is recorded and students are assessed on the basis of all aspects of their academic performance, including their progress, the extent to which they complete independent projects and other extra-curricular performance, as are the application criteria for Western universities (Chuenjitwongsa et al., 2018, and Farley & Yang, 2019). It is possible that this is influenced by the traditional NCEE³⁴-examination mentality of international schools' administrators, teachers, and parents, that is, the only way to enroll in a top university is to achieve high grades in the NCEE-exams. The IB³⁵ and AP³⁶ programs are competency-based curricula, so international school administrators and teachers in China should study the IBO³⁷ and CB³⁸ assessment standards for students and actively change their traditional examination mindset to provide students with the correct assessment system for their coursework.

In addition to this, most students enter international high schools because of their unsatisfactory junior high school results, which prevent them from enrolling in high schools under the local Chinese education system (Ms. Zhang, personal communication, May 24, 2022). Students in international high schools therefore lack autonomy on the one hand. For example,

³⁴ Chinese college entrance exam (NCEE)

³⁵ International Baccalaureate (IB)

³⁶ American Advanced Placement program (AP)

³⁷ International Baccalaureate Organisation (IBO)

³⁸ College Board [CB]

many courses in international schools require students to use the internet, yet some students will be doing things online at that moment that are not relevant to the course (Ms. Li, personal communication, May 24, 2022). This leads teachers to consider using traditional teaching methods, whereby the teacher delivers knowledge and the students take notes. On the other hand, the low English proficiency of the students hampers the teacher's English-only delivery (Ms. Li, personal communication, May 24, 2022). This suggests that international high schools in China ought to strengthen students' autonomy and English proficiency when they first enter high schools.

Limitation and implications

This study was conducted to measure the academic emotions of science teachers and students at international high schools in the mainland of China by using Control-Value Theory. The TES³⁹ measures teachers' three teaching emotions (i.e., enjoyment, anxiety and anger) during teaching process, and in this study, all three teaching emotions were also measured. The AEQ⁴⁰ requires "measuring students' enjoyment, hope, pride, relief, anger, anxiety, shame, hopelessness and boredom during class, while studying, and when taking tests and exams" (Pekrun et al., 2011, p. 36). However, this study only measured four learning emotions - enjoyment, pride, anxiety, and hope - during class. Therefore, the conclusions drawn, only apply to "during class". In future research, it is possible to continue to measure students' other five learning emotions during class, as well as measuring learning emotions in two other scenarios. In addition, we would like to explore the attitudes of science teachers. As we all know, science subjects do not only include the two subjects of biology and chemistry, but should also include physics, environmental science, food science, and etc. The views of biology and chemistry

³⁹ Teacher Emotions Scale (TES)

⁴⁰ Achievement Emotions Questionnaire (AEQ)

teachers do not certainly apply to science teachers of other subjects. Future research will also need to include teachers from a wider range of subjects.

Another most important issue in this study is the small sample size. The sample contained only four science teachers and eight students. Additionally, they all come from the same international high school. Although one of the teachers had previously taught at another international school, it has to be said that the attitudes and views of these teachers and students on international school policies are limited to the one or two schools and are not representative of international schools across the whole of mainland of China. However, the quality of this interview study can be assured. Future research should include teachers from more schools and more districts without neglecting the depth of information as gathered in this research.

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Appendix

Appendix 1: Questionnaire---teachers

在学校上课可以引起不同的感觉。这个问卷是关于你在学校上课时可能经历的情绪。

Attending classes at school can induce different feelings. This questionnaire refers to emotions you may experience when being in class at the school.

The first part is about your background information.

1. What would you like me to call you?

你希望我如何称呼你？

2. Which subject are you teaching?

你是教授哪一门学科的老师？

3. Which classes are you currently teaching?

你现在教授哪几个班级

4. What textbooks and teaching materials are you currently using?

你现在使用哪本教科书教授生物/化学

5. How long have you been teaching?

你当老师多少年了（从哪一年开始）？

6. Did you ever study/teach abroad before?

你曾经在海外留学或当过老师吗？

7. Have you learning in China before?

你曾经在中国的其他学校教过书吗？

8. How long have you been teaching at this school?

你在苏州工业园区外国语学校教书多久了？

The second part is about your experiences as a teacher.

下面这些问题是关于你在日常课堂教学过程中可能产生的情绪，请联想一下日常课堂教学的场景。

1-very agree 2-agree 3-neutral 4-don't agree 5-extremely don't agree 1-非常同意 2-同意 3-中立 4-不同意 5-非常不同意			
1.	Enjoyment	joy 1	Do you generally enjoy teaching? Why/Why not? 你喜欢当老师吗？为什么/为什么不？
2.	Anxiety	anx 1	Do you feel anxiety when you teach these students? Could you show me an example? 你在教受 11 年级的学生时候有没有感到焦虑的时候？可以举一个让你感到焦虑的時刻的例子吗？
3.	Angry	ang 1	Do you get annoyed in class? Can you describe a moment? 你在教课的过程中会不会感到烦恼？可不可以详细描述一个让你烦恼的瞬间？
4.	Enjoyment	joy 2	Do you often have a reason to be happy while you teach? Could you show me an example? 你在教书的时候经常感到很开心吗？可以举一个在教书的过程中让你感到开心的例子吗？

5.	Anxiety	anx 2	Do you feel worried during your preparations for the lesson? Why/why not? 你在备课的过程中会不会担心呢？为什么/为什么不？
6.	Angry	ang 2	Does teaching make you feel frustrated? Why? 教书有没有让你感到沮丧（挫败感）的时候？为什么？

The third part is about school curriculum policy

1. Do you have a positive or negative attitude towards the school's current curriculum policy?

Which areas do you think could be further improved?

你对学校的课程设置持有积极还是消极的态度？你觉得学校设置的那些部分还需要提高？

2. What are in your opinion the advantages and disadvantages of the school's current curriculum policy? To what extent do these advantages support your teaching? To what extent do these disadvantages make you feel the anxiety?

在你看来学校现行的课程安排的优缺点有哪些？你觉得这些优点对你的教学在多大程度上是有帮助吗？那么这些缺点在多大程度上让你感到教学上的焦虑。

Appendix 2: Questionnaire---students

Attending classes at school can induce different feelings.

在学校上课可以引起不同的感受。

The first part is about your background information.

1. What would you like me to call you?

你希望我如何称呼你

2. Which class are you currently enrolled in? Are you taking biology or chemistry class?

你现在就读于哪一个班级？你选修的科学课是生物还是化学？

3. Why did you choose this subject?

你为什么选择这个科目？

4. How did you do in biology/chemistry? What level did you rank in your class (top, middle, or lower level)?

你的生物/化学成绩怎么样？在班级里会排到优秀，中等，还是垫底？

The second part of the interview refers to emotions you may have experienced when being during Bio/Chem class at the school. The following questions pertain to feelings you may have experienced **DURING** class. Please indicate how you feel, typically, during class. You can answer the question in terms of how satisfied you are with the school policy and teachers.

访谈的第二部分是关于你在学校日常上生物/化学课时可能经历的学习情绪。以下问题涉及到你在上课时可能经历的感受。请指出你在上课时的感受。中立（几乎没有同意也没有不同意，也有同意与不同意）。

1-strongly disagree 2-disagree 3-neutral 4-agree 5-strongly agree 1-非常不同意 2-不同意 3-中立 4-同意 5-非常同意			
1.	Enjoyment	CJOA2D	Do you enjoy Bio/Chem class? 你喜欢生物/化学课吗？
2.	Pride	CPRC1D	Do you take pride in the fact that you learned all the material your teacher provided during Bio/Chem class? 你是否会因为你能学会你的生物/化学老师的提 供的所有知识而感到自豪？
3.	Anxiety	CAXA3D	Do you ever have the moment that feel nervous in Bio/Chem class? 你在生物/化学课上是否会觉得紧张呢？
4.	Hopeless	CHLA2D	Do you often feel hopeless in your Bio/Chem class? 你是否经常觉得学好生物/化学是无望的？
5.	Enjoyment	CJOM2D	Do you feel that because you like the subject, you always want to participate in Bio/Chem class activities during class? 你觉得是因为你喜欢化学或是生物课，所以在 课堂上你非常想参与到课堂活动中吗？
6.	Pride	CPRM1D	Do you ever have the moment that you feel more motivated to take Bio/Chem class when you give

			<p>the right answers during class?</p> <p>你是否会因为你在生物/化学课堂上答对了老师提问的问题而感到有动力学习这门课程呢?</p>
7.	Anxiety	CAXM2D	<p>Do you ever have the moment that avoid answering questions in Bio/Chem class because you are afraid of making mistakes?</p> <p>你在生物/化学课上是否因为害怕回答错你老师提出的问题而拒绝回答问题呢?</p>
8.	Hopeless	CHLC2D	<p>Do you feel hopeless of understanding what you are learning in Bio/Chem class?</p> <p>你是否会觉得理解生物/化学知识是没有希望的?</p>
9.	Pride	CPRC1D	<p>Do you feel proud of being able to keep up with you Bio/Chem teacher during the class?</p> <p>你是否会因为你能跟上你的生物/化学老师的学习进度而自豪。</p>
10.	Anxiety	CAXP3D	<p>Do you feel anxious in Bio/Chem class because you don't understand the important questions in the class?</p> <p>在生物/化学课上你是否会因为不理解一些重要的知识点而感到焦虑呢?</p>

The third part is about school curriculum policy

3. Do you have a positive or negative attitude towards the school's current curriculum policy?

Which areas do you think could be further improved?

你对学校的课程设置持有积极还是消极的态度？你觉得学校设置的那些部分还需要提高？

4. What are in your opinion the advantages and disadvantages of the school's current curriculum policy? To what extent do these advantages support your learning? To what extent do these disadvantages make you feel anxious?

在你看来学校现行的课程设置的优缺点有哪些？你觉得这些优点对你的学习在多大程度上是有帮助吗？那么这些缺点在多大程度上让你感到学习上的焦虑。

Appendix 3: Summary of science teachers' attitudes towards international curriculum

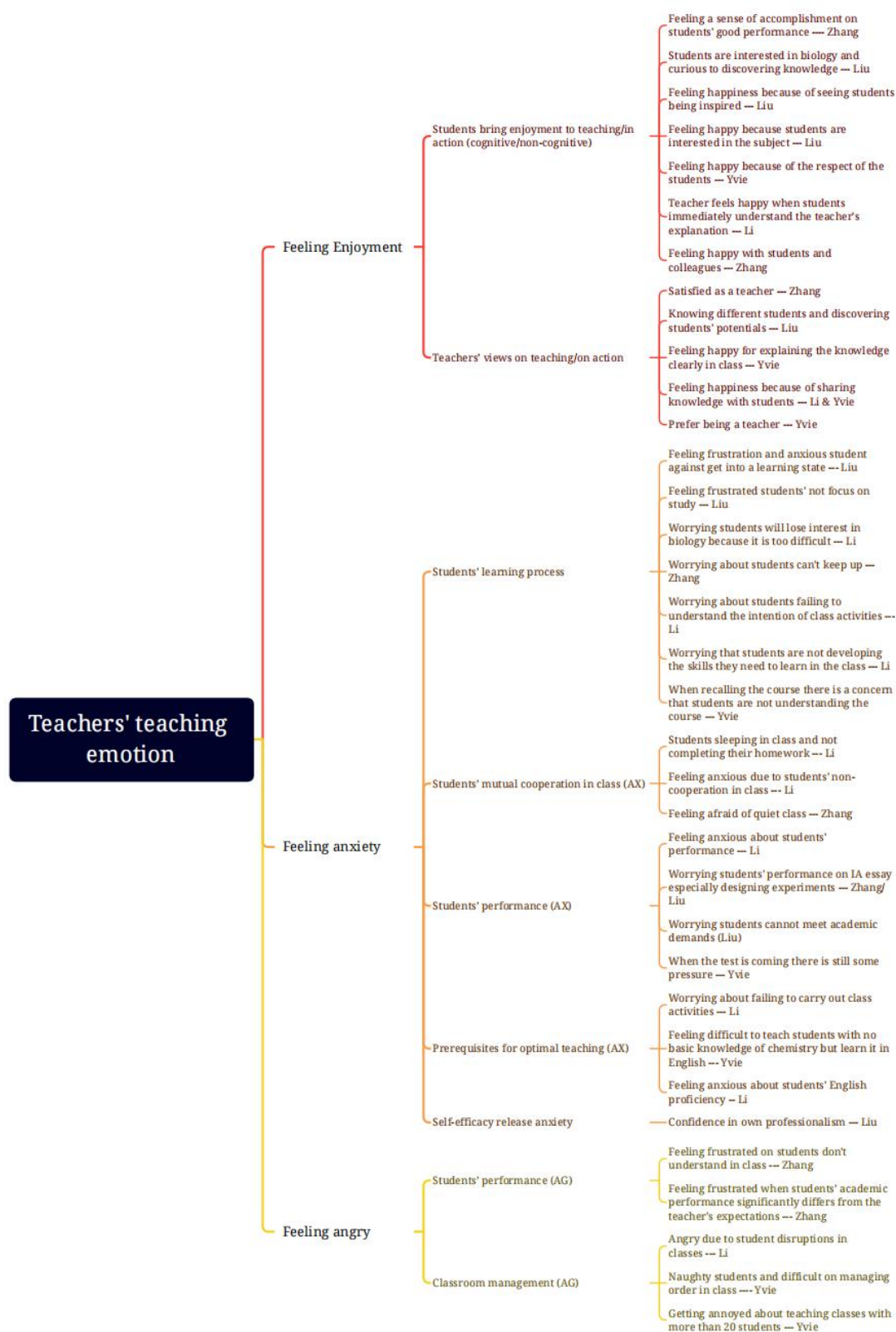
Transcript	Competency-based curriculum			Implementation of interdisciplinary	Teaching resources	International education philosophy	Students' autonomy
	Competency-based	Centrality of the Learner	Teacher as a facilitator of learning				
T1	Good conduct: * Enable students to develop all aspects of their skills without too much academic pressure. * A wide range of educational programs and subjects for students to choose on according to their future requirements and interests	Good conduct: * Student voices are involved	Not mentioned	Weakly implementation: * Schools don't have enough resources	Not enough: * Not very professional foreign teachers * Inadequate lab equipment	Not very international: * Students' weak autonomy	Weak
T2	Good conduct: * Enable students to develop all aspects of their skills * Improving students' autonomy * Students are able to manage their learning according to their interests.	Weakly conduct: * Students do not have the opportunity to design their extracurricular activities	Not mentioned	Weakly implementation: * No such in-class and extra curriculum activity	Not enough: * Inadequate curriculum setting	Not very international: * Students' weak English proficiency * Students' weak autonomy	Weak
T3	Good conduct: * Enable students to develop all aspects of their skills (Critical thinking, leadership, question researching) * However, forcing students to study the IB program	Weakly conduct: * Teacher-centered (Students' opinions need to be adopted by the teacher in moderation as the teacher is the professional)	Good conduct: * Students can do what they want to do such as volunteer and do some charity work in CAS classroom.	Weakly implementation: * Teachers are not professional enough * Schools don't have enough resources	Not enough: * Inadequate curriculum setting * Inadequate lab equipment	Not very international: * Only textbooks are English, but Chinese working environment	Not mentioned
T4	Good conduct: * Enable students to develop all aspects of their skills (Critical thinking)	Good conduct: * Small class sizes allow students to learn in a relaxed classroom climate	Good conduct: * Students do their own social project led by their supervisors in CAS class * Students do their own academic project led by their supervisor during EE time	Weakly implementation: * Teachers do not understand the concept of interdisciplinary teaching	Not enough: * Not very professional teachers * Inadequate lab equipment	Not very international: * No internationalization other than English textbooks	Not mentioned

Appendix 4: Summary of students' attitudes towards international curriculum

Transcript	Competency based curriculum			Exam-oriented curriculum	School schedule (concentration issue)	Overall attitude
	Competency-based curriculum	Teacher autonomy	Centrality of the Learner			
S1	Good conduct: * A wide range of subjects for students to choose on according to their needs * Developing critical think skill and problem-solving skill	Good conduct: * Teacher offers students other learning materials	Not mentioned	Overly exam oriented: * The questions explained by teachers in classes are too simple and can only cope with IB exams.	Reasonable * Reasonable class time per day	Positive
S2	Good conduct: * Students select courses according to their interests * Course content close to life * Implementing group teaching Weakly conduct: * Rare interdisciplinary curriculum implementation * Failure to provide students with proper planning for their subjects	Good conduct: * The teacher explains the knowledge in the class with examples from life	Not mentioned	Good conduct: * Lectures based on the examination syllabus	Not mentioned	Positive
S3	Good conduct: * Using labs to support students understanding * Professional counselors give students a proper subject planning	Good conduct: * There is no fixed textbook for some international curriculum, some teachers write their own slide * Teacher offers students practice questions	Good conduct: * Student voices are involved	Good conduct: * The teachers' professionalism gives students a very solid grasp of knowledge for achieve good academic performance.	Unreasonable * The course-hour is relatively short, resulting in a tight learning schedule for students	Positive
S4	Good conduct: * Students select courses according to their interests and future needs.	Good conduct: * There is no fixed textbook for some international curriculum, some teachers write their own slides * Teacher offers students practice questions	Not mentioned	Good conduct: * Relatively few labs to support teaching, mostly problem exercises * Teachers' professionalism allows students to successfully pass the exam	Unreasonable * Excessive course duration leads to students not being able to focus on the course	Positive

S5	Good conduct: * Students select courses according to their interests and future needs. Weakly conduct: * The school offers a limited number of subjects for students to select from	Not mentioned	Not mentioned	Good conduct: * Relatively few labs and practice to support teaching, mostly problem exercises	Not mentioned	Positive
S6	Good conduct: * Students select courses according to their interests and future needs. * Developing creativity skill.	Good conduct: * Teachers prepare lessons based on students' needs for knowledge	Not mentioned	Good conduct: * Relatively few labs to support teaching, mostly problem exercises	Unreasonable * The course duration is relatively short, resulting in a tight learning schedule for students	Negative
S7	Good conduct: * Students select courses according to their interests and future needs. Weakly conduct: * The school offers a limited number of subjects for students to select from	Good conduct: * Teacher offers students practice questions	Not mentioned	Good conduct: * Labs related to the content of the class to support students' understanding, * Mostly problem exercises.	Not mentioned	Positive
S8	Weakly conduct: Rigid requirements are not consistent with the development of students' learning abilities.	Good conduct: * Teacher offers students practice questions	Not mentioned	Good conduct: * Lectures based on the examination syllabus	Unreasonable * Excessive course duration leads to students not being able to focus on the course	Negative

Appendix 5: The code tree







Teachers' suggestion

Weak autonomy of students

- Schools should cultivate students' autonomy
- Weak autonomy of students, resulting in their inability to learn independently in a relatively relaxed international school climate

Low admissions standards for students

- International schools have low admissions standards for students
- Raising standard for students' recruitment

Increase teachers' teaching motivation

- Rewarding teacher based on their teaching performance can increase their motivation
- Rewarding teacher based on their teaching performance

Interdisciplinary curriculum

- International schools do not focus on interdisciplinary curriculum development
- Teacher believes interdisciplinary teaching is beneficial to the overall improvement of students

Internationalization philosophy

- International schools work in Chinese, not English
- International schools are only introducing international teaching materials, not applying international education concepts
- School's extracurricular activities are not international enough
- Due to the insufficiently internationalized teaching philosophy of the school, teachers may be concerned about their future in the field of international education
- Anxiety for teachers due to the lack of internationalization in the curriculum policies of international school
- International curriculum in China is an exam-oriented curriculum (traditional Chinese teaching style)

Teacher-dominant curriculum

- International schools should promote a teacher-dominant curriculum, because teachers are professional

Students' weak English proficiency

- International schools should strengthen students' English proficiency
- English proficiency of Chinese students is relatively weak.

Students-dominant extra-curriculum activity (students' center)

- International schools should allow students to design their own interdisciplinary extra-curricular activities
- International schools should allow students to design their own interdisciplinary extra-curricular activities

Encourage students to challenge authority

- International schools should encourage students to question their teachers

Students' emotions

