Are customized tasks based on the learners' multiple intelligences effective in adult English learning?

--- a practical study through MOOC in a Chinese college

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1 Aim

Since it is proved to be a good model in cognitive theory, multiple intelligences theory (MI theory) has been applied to education including language learning. Different people are intelligent in dealing with different problems, some in spatial problem and some in musical problem. In task-based language learning, the adaptive tasks for different students are technically helpful in second language learning. Though intentionally applying MI in school has got positive feedback in most schools (Davis *et al.*, 2011) and a series of curriculums and tasks have been successfully designed (Fleetham, 2006), the research on correlation between second language acquisition and MI in classroom often get negative or only partial-positive result (Akbari and Hosseini, 2008; Roohani and Rabiei, 2013; Ahmadian and Ghasemi, 2017). The possible reason may be the complexity of classroom, a mixture of different students, making the language tasks targeted to the intelligences of all students quite impossible. So, the self-learning context through MOOC which can aim each task to individual student could be a better research platform.

This research is to take advantage of the MOOC platform to test whether the tasks specially designed according to each adult learner's multiple intelligence are effective in helping learn English as their second language. To fully study on this question, three sub-questions need to be clarified:

1. Are language tasks based on MI more effective than traditional linguistic tasks?

2. Are the tasks aiming to the learner's types of intelligence better than mixture of tasks or not?

3. Does mismatch between tasks and intelligence hinder language learning?

First question studies that the tasks themselves, even if not specially designed for individual learners, are better than traditional linguistic tasks? It is very close to classroom context where a variety of tasks and activities applied in teaching. If the answer is yes, it proves the viability to use MI theory in classroom. Second question is to test the effectiveness of customized tasks. With the approval of that, it means accurately targeted tasks are best to enhance language learning. The aim of the third question is the same as the second, but it adds the weight to the accurate targeting.

The unsuitable tasks will cause the failure of learning and thus needed to be very cautious of task choice if the answer to the question is yes.

2 Rationale

Multiple Intelligences Theory, since its first publication in late 1983, has been contributing to the cognitive science and language learning. According to Gardner (1983, 2006), the intelligence measurements like IQ test and Scholastic Assessment Test (SAT), claiming to select intelligent people from average ones, cannot draw the whole picture of intellectual ability. In his view, the cognition of a person has many different facets, and thus human intelligence should be regarded pluralistically. Tests like IQ and SAT are very unfair because they are one-dimensional with their tasks only focusing on math, linguistic and reasoning facets. (Gardner, 2014, pp. 3–4). People's low scores in these tests show their lack of aptitude in these facets, but they may demonstrate high aptitude in other ones that haven't been exposed. Gardner (2011) summarizes eight intelligences and points out there may be more potential ones. These intelligences are linguistic intelligence, logical-mathematical intelligence, spatial intelligence, musical intelligence, naturalist intelligence, bodily-kinaesthetic intelligence, interpersonal intelligence, intrapersonal intelligence. The descriptions of each intelligence illustrated in the table below are cited from *The Theory of Multiple Intelligences* (Davis *et al.*, 2011).

Linguistic	An ability to extract information from language and make use of verbal and written language to work.
Logical-Mathematical	An ability to solve abstract problems, make mathematical calculations, and dealing with numbers.
Spatial	An ability to recognize directions, locations of objects, and understand maps and spatial images.
Musical	An ability to sense the beats, rhythms and melody and produce them.
Naturalist	An ability to identify the natural creatures, weather, and natural environment.
Bodily-Kinesthetic	An ability to us one's own body to achieve physical tasks.
Interpersonal	An ability to sense other ones' emotion and interact with them.
Intrapersonal	An ability to recognize and understand his or her own inner thought

To test whether the individual is intelligent or not at each facet, pitifully there is still no psychometric or neuro-imaging techniques. The only way is through domains or disciplines that people may be good at (Davis *et al.*, 2011, p. 7). If one is good at singing songs, it can be convincingly speculated that he or she has a good ability in music intelligence. People making architecture drawing reasonably manifest their spatial intelligence highly developed. Soccer players are of course more bodily-kinesthetically

intelligent than average people, so are the public relation specialists in interpersonal domain. Therefore, a series of questionnaires are designed, in the light of the typical tasks in each domain or discipline, to test people's multiple intelligences capacity. Via the test, people can have a clear judgement on which intelligence they have or not. However, it needs to be of concern that totally no capacity on certain intelligence is hardly seen, besides on the ones that have innate or acquired damage on brain. All people have the full range of intelligences, the only difference being their degrees of strength and weakness (Gardner, 2021). In addition, no two individuals possess exactly the same profile of intelligences, there always being differences in some aspect (Davis *et al.*, 2011, p. 9).

MI theory makes a great impact on education. Literature shows a high correlation between the students' school record and the strong intelligence (Bordei, 2015). Students who get a high score in a facet of MI test are usually the best students in the corresponding course in school. Students tested of high score in spatial intelligence, for example, are the ones regarded by the teacher as the best in art class. However, this correlation means nothing in the improvement of education, except for a proof of the validity of the MI test. More important is how to use the MI theory to enhance study, or more specifically, how to take advantage of individual high intelligence to learn things he or she is not that intelligent at. To achieve that, many schools have transferred their uniform educational model to the models that rely on different domains. Gardner describes these domains in education as entry points, via which different students can achieve same educational goal (Gardner, 2014). For example, some students can easily acquire the knowledge of a historical event from the description in the textbook if they are linguistically intelligent, but the students only strongly intelligent in space may need the picture or drawing to enter the field of the same event; bodily-kinaesthetically intelligent students need the simulation to get involved, and the interpersonal ones need the discussion with each other. All these tasks and activities are entry points that let student enter the field of history. Same idea is also applied to language learning. There can be different entry points for the accomplishment of the same language learning goal.

Since identifying the correct entry point can facilitate learning, it is rational enough to speculate that learners will learn fastest and most efficiently if the entry point is at their strongest intelligence. Similarly, with the entry point at one's weakest intelligence, the learner may even be unable to enter the learning. However, the practical proof is still in lack whether the speculation is right and to what extent the MI models enhance the language learning, in spite of some good reports in various schools about the application of MI. Research so far is mostly one-time on the relation with language ability, or classroom behaviour, or learning strategy, or learner belief, etc. Durative and developmental research is very insufficient, most of them through classroom observation and interview. The lack of quantitative data is possibly because of the complexity of classroom application. The ideal way is to set up several entry-point stations in classroom where students can choose their favourite station to finish tasks

there. All the tasks are aimed to the same language learning point, despite their different forms. This model that gives fully play to one's intelligence has a lethal problem, which is that the task-time consuming of each station is very different. Students in one station may be very busy while ones in another are having nothing to do, making the class very messy and inefficient. The teacher's burden is extremely heavy that he/she needs to instruct the students to solve 8 different types of tasks besides explicating the knowledge within 45 minutes, making the mission very exhausting and his/her attention to all the students nearly impossible. Besides, the environment is also thorny because the stations need to be rearranged and prepared before each lesson. A more common application of MI, with less efficiency but more practicality, is the mixed use of tasks. For each stage of lesson, the teacher designs one task focused on one intelligence, so the tasks could cover all intelligences for the whole lesson. Students get the same task at each stage, and thus everyone get involved in all intelligences during the whole lesson. In general, we may get the conclusion that all students make a progress because of MI application, but from individual perspective, how MI is used to enhance learning is still a question hardly answered.

A good replacement of classroom is Massive Open Online Course (MOOC), concerning the MI application. Its biggest advantage over classroom is the individuality. Students can learn by themselves without the influence of their peers, and teachers don't need to consider all students at the same time. In addition, all the knowledge points are programmed and stored, so there is no need to change for each lesson. Therefore, to put the entry-point stations on MOOC is very promising where teacher set different tasks aligned to the type of students and where students take their own time to finish their own tasks to acquire the same competence of language. The newly developed MOOC is no longer a broadcast of courses, but a platform that can do more than teaching and self-learning, including testing, course management, and class management, which makes it an ideal assistance of educational research. In my research, I will utilize MOOC platform to test the individual MI and language ability, and try to find their developmental relationship after two months' task-based language learning on the platform.

3 Subjects and Tools

3.1 Subjects

The perfect subjects of the research should be 80 Chinese students from one college whose English capability nearly at the same level. All the students have their own accounts of MOOC platform constructed by the college. To make sure their equal level of English, students are chosen in the second grade where the size is usually 5000-6000 students in the college, and their first-year English course marks should be between the 60%-70%. Such a section of marks which usually accounts for most population shows a fair comprehension but far from skilled using English. After getting their permission of taking part of the research, a test modified from IELTS is designed including listening,

speaking, reading, and writing, and handed out via the platform. Only students whose all 4 parts have the same marks respectively are nominated as the subjects. For example, if most students' marks are 5.5, 5.5, 6, 4.5, then those students are chosen as subjects while students of other marks are excluded.

3.2 MI Assessment

To test the MI ability of the students, the Multiple Intelligences Developmental Assessment Scales (MIDAS) is used. MIDAS, elaborated by C. Branton Shearer, is a research-based self-report measure of intellectual disposition (Shearer, 2005). Compared to other MI assessment test, MIDAS is more focused on the quantitative questions rather than answering yes/no. The result of the MIDAS is clear percentage scores of each intelligence. It has five versions in terms of the subjects' age, with questions more psychologically adaptive and targeted on their real experience. In this research, the adult version is adopted and translated to Chinese in order to exclude the influence of misunderstanding. For each intelligence, there are more than 20 questions that are all very simple and understandable without any professional knowledge. The sample questions about music intelligence are illustrated below (Shearer, no date):

1. As a child, did you have a strong liking for music or music classes?
   A= A little.
   B= Sometimes.
   C= Usually.
   D= Often.
   E= All the time.
   F= I don't know.

2. Did you ever learn to play an instrument?
   A= No.
   B= A little.
   C= Fair.
   D= Good.
   E= Excellent.
   F= I don't know.

3. Can you sing "in tune"?
   A= A little bit.
   B= Fair.
   C= Well.
   D= Very well.
   E= Excellent.
   F= I don't know.

Another advantage is the sophistication of the results. There are sub-elaborations of each intelligence, helping the subjects, teachers, and parents understand more about

the subjects' strength and weakness, and thus gives the instruction of education. Music intelligence, for instance, is divided into vocal, appreciation, instrument, and composer; spatial intelligence is categorized into spatial awareness, art design and working with objects. For every sub-category, there is a mark and a grade from very low to very high. With these grades, the learning tasks designed could be even more accurately localized. However, in this research, tasks designing only target to eight main intelligences out of the convenience and practicality.

3.3 MOOC platform

MOOC platform used in the research is Chaoxing, a very popular platform among Chinese universities and colleges. With both webpage and mobile app, its function covers the library, journal database, distant teaching, online course, assignment, and examination. Teacher can easily design all kinds of tasks through its backend and assigns them to the students. The students have to finish the tasks on their mobile phone or computer, and the whole process and results are recorded and sent to the teacher. The teacher can set the tasks automatically or manually remarked, and students can see the correctness and feedback. Class management can also be accomplished in the backend. With the student numbers and names, group setting is very convenient.

3.4 Modified IELTS

Language assessment is used to test the subjects' English level. Two tests are needed, one before the research and one after the MOOC learning. Both tests are tasks modified from Cambridge Academic IELTS, including reading, listening, speaking, and writing part. Their marking criterion is the same as the one of IELTS, with the full mark of each part as 9. All 4 marks of each student are recorded in both tests, but only the overall marks are used to calculate whether the student make a progress. The reason of marking all 4 parts is to select the students exactly at the same level of English ability. To compare the overall marks is to exclude the influence of different tasks. It is naturally to assume that reading practices enhance reading ability and interaction tasks improve speaking. Thus, the comparison of reading marks between students doing reading tasks and students doing interaction tasks is very unfair and senseless. Only the overall marks can reflect the general improvement of English ability of the students.

3.5 Questionnaire on attitude and strategy

A questionnaire is also needed to assess the subjects' attitude towards the tasks and possible strategies they use in the learning. The reason of doing so is because some students may be very negative to the tasks and try other learning strategies as a complement in order not to fall behind. A possible assumption is the negative correlation between the attitude and the strategy use, that is, the more dislike for the tasks the subject feels, the more possibly he/she will use other strategies. All questions are able to be quantified while the strategic questions are also with informational and optional answer. Examples are:

1. Are you interested in the tasks?
   A= Very much
   B= fairly
   C= hard to say
   D= fairly not
   E= not at all

2. Are the tasks helpful for your learning?
   A= Very much
   B= fairly
   C= hard to say
   D= fairly not
   E= not at all

3. Do you use other complementary methods of learning? If you do, what are they?
   A= Yes. It is/They are _____
   B= No

3.6 IBM SPSS Statistics

As one of the most successful tools to do quantitative social science research, IBM SPSS Statistics is used to calculate the deviation of the English test scores between groups as well as the correlation between the MI-task mismatch and the negative attitudes.

4 Methodology

4.1 Tasks preparation

The experimental period of the research will last 2 months, 4 English knowledge points covered. The first step of the research is to design all the tasks for the English knowledge points. The task-types are elaborated according to 8 intelligences. The overall time span of each type of tasks is designed as similar as possible in the light of the ability of the skilled English teacher. For instance, the time of finishing all the reading comprehension tasks on 1 language point should be more or less the same to that of practising the roleplays. The table below is the illustration of 8 task-types regarding how to express future tenses.

intelligences	types of tasks
linguistic	reading comprehension of future topic
logic-math	grammatical sudoku of future tense
visual	making cartoons or mind maps about future
musical	singing songs whose lyrics related to future tenses
kinaesthetic	video-recording roleplays with assigned scripts about future events

interpersonal	video-recording discussions according to instruction about future events
intrapersonal	writing stories and essays about future
natural	watching video clips of environment and making reviews

4.2 MI test and grouping

All the subjects take the MI test, but the results of the test are unknown to them. The questions of the test are pseudo-randomized so that they cannot anticipate the result. The test can be delivered through MOOC, through which all the subjects' strong and weak intelligence are recorded and sent to the backend. For the students who have more than one strong/weak intelligence, only one intelligence is chosen to preserve. As for which one to preserve, the rule is to try to keep every intelligence have similar number of people.

80 subjects are randomly and averagely divided into 4 groups, namely strong group, weak group, mix group and control group. With strong group, students' MOOC accounts are only concerned with tasks of his strongest intelligence. For example, if Subject A whose strongest intelligence is linguistic is within the strong group, then all A's tasks are linguistic type of tasks; Subject B within the strong group whose strongest intelligence is spatial gets all cartoon tasks exclusively. Similarly, a subject within weak group only receives tasks in line with his/her weakest intelligence. Mix group subjects are randomly assigned with all types of tasks of different intelligences, but the aggregation of tasks is the same as the other groups. Control group learns English with a more traditional way that all tasks belong to linguistic type such as reading comprehension, blank-filling, and paraphrase, taking no account of the subjects' intelligences.

The strong group stands for the completely making use of intelligence. The weak group tends to testify the influence of mismatching the tasks with the intelligence. The mix group who will learn mixed types of tasks is a mimic of usual classroom application of MI to language learning. The control group replicates the traditional teaching model that focuses on the linguistic features in language teaching.

4.3 MOOC learning

The tasks prepared in advance are assigned to the students via their MOOC accounts in line with their intelligence and group. The tasks are released in batches as the progress of the teaching. The distant learning teaching material such as grammar explanation is uniform to every subject, only the tasks related to it are unique to different types of intelligence. A new task is released in every two days, and students need to repeat doing it until complete correctness or permitted by the teacher before the release of next batch. The whole process lasts for two months.

4.4 Questionnaire

Subjects are asked to finish the questionnaire about their attitude towards the tasks and complementary strategies. The questionnaire is delivered via MOOC after the end of the two months. Answers to attitudinal questions are graded from 5 to 1, corresponding to the choice A to E. Answers to the strategic questions are translated to 1 and 0, as counterparts to yes and no. All the marks of each attitudinal questions are averaged to get a final mark that from 5 to 1. The strategies students use for complement are also recorded.

4.5 English ability test

Two weeks after the finish of MOOC learning, the English ability test is taken. The reason why not test immediately is to take into account the forgetting that is a very important factor of the learning effectiveness. Students are tested of reading, listening, writing, and speaking by the modified IELTS, and each one's overall mark is recorded.

4.6 Data analysis

1. The difference analysis on the English marks is made by ANOVA among the strong groups, weak group, mix group, and control group. If there is significant difference between each of them, that means the tasks based on MI have big influence on the English learning.

2. The difference analysis on the attitude towards the tasks is made by ANOVA among the strong groups, weak group, mix group, and control group. The significant difference between each of them manifests the task-MI match have big influence on the subjects' attitudes to tasks, and the contrary result means no influence.

3. The correlative analysis is made by *Goodman and Kruskal tau* between all subjects' attitude marks and strategic choices. It is to prove the assumption that the negative attitude toward the tasks will lead the subjects to ask for the help of other learning strategies.

4. The difference analysis on the strategic choices is made by ANOVA among the strong groups, weak group, mix group, and control group. The result will show subjects of which group are willing to ask for the help of other learning strategies.

5. From the questions about the strategy names, the research may also find out what the most common strategy college students use once they are unsatisfied with the curriculum.

5 Expected results

1. The English ability scores are of very significant difference among all four groups, and the mean score of strong group > mix group > control group > weak group. Or

the difference between strong and mix group is not significant, so is the difference between control and weak group.

2. The attitudes towards tasks are very positive in strong group and positive in mix group. The attitudes in weak group are very negative.

3. There is a high correlation between the degree of negative attitude and the choice of other strategies. The weak group has the most subjects to use other strategies, while the subjects in strong, mix and control group have few intentions to do so.

6 Ethical concern

To do the research, the permission of the college is needed to enquire all the second students' first-year record of English course. All the subjects are all volunteered to join the research and will sign with the researcher the contract concerned with their rights and obligations. The contracts are also sent and collected via MOOC. All the personal data are kept secret and only retrieved by the researcher and the subject himself/herself. Even the teachers who remark the tasks cannot refer to the data after the research. In addition, the MI score of the subjects will be disclosed via MOOC to themselves after the research is over.

The major concern about the ethic is the intentional mismatch between the MI and the language tasks. 20 students are put in the weak group where they need to take advantage of their weakest intelligences to complete the tasks. Such a learning will be very inefficient and the process very discouraging. To avoid much stress, the learning period is strictly confined to 2 months, a safe timespan from causing any harm to language competence, and subjects are also allowed to use their own strategies to help learning.

7 Timetable

The whole research will last for one and half year including the thesis writing. The timetable is listed below.

Time	Tasks
May 2022	Literature review
June- August 2022	Design the tasks according to intelligences and language points
September- October 2022	Transcribe tasks to the MOOC
October 2022	MIDAS test
November – December 2022	Students' self-learning
January 2023	Language skill test & Questionnaire

February 2023	Data Analysis
March – November 2023	Thesis Writing