The Students' Well-Being in Chemistry MOOCs in Secondary School

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Abstract. Well-being has long been the subject of study and attention since it is the aim of human endeavor. With the initial goal of longing for kids to grow up happily, well-being also enters the chemistry classroom. It takes on the highest purpose of the highest education to direct students towards a joyful, unforgettable, and lovely learning journey that is filled with vigor, hope, and vitality. The pursuit of the ability to assist students to achieve sustainable lifelong well-being means that teaching activities are no longer a process of students' depression, grievances, and complaints and instead make meaningful learning a happy growth path for students. Thus, once any factors changed, students' well-being will be effected.

And teaching-learning method is one of a significant factor in education. The old educational model has been significantly impacted by the advancement of digital technology and the creation of educational ideas. The "Internet + online education" model, particularly MOOCs, has rebuilt the traditional teaching framework. The fundamental attributes of MOOCs are their size, networking, and openness. The learning consequence and students' well-being will be substantially enhanced, because MOOCs, as a self-regulated model, might stimulate students' motivation. As the self-regulated model could stimulate students' motivation in the way of increasing powerful, adjustment and migration function.

Keywords: Educational Psychology · Students' Well-being · Digital Technology · MOOCs · Chemistry MOOCs · Secondary School

1 Introduction

School is a environment which is composed of various commitments, and each of them has influence on students' well-being. The aim of teaching forms the foundation, central idea, and animating force of all educational endeavors. It represents the highest level of logic in education and is crucial to all aspects of learning. In addition to producing inventive individuals who can actively contribute to the building of the nation, education serves to make its students happy [4]. Educator also pointed out that, the main purpose of education is to make students happy, and this well-being cannot be sacrificed for any benefit, so there is no need to question this [14]. Besides, students' well-being is regarded as significant research topic not only for researchers but for educational departments of governments.

But with the fusion of these components with digital technology and media, the status quo of students' well-being at school are supposed to be considered again. New online open learning courses and MOOC-based online learning platforms have grown quickly as the Internet has been more widely used [7]. This offers resources for schools and institutions to create innovative teaching strategies and a fresh viewpoint for raising the caliber of instruction [11]. MOOCs offer both opportunities and problems for the fundamental education. On the one hand, the MOOC platform brings a wealth of educational resources, which provides students with the best learning resources. On the other hand, the MOOC platform aligns with the changes of teaching-learning method. Because of individual difference of acceptance level and attitudes to the new methods, it might have negative influence on not only teachers' well-being but on students' well-being [10]. Thus, it is necessary for the future studies to explore the problem of well-being in the changing social background. Based on the above, this study focus on the relationship between digital technology used in education, especially MOOCs in chemistry, and students' well-being, trying to make a conclusion of the research status and providing a theoretical basis for the futures studies.

2 Understanding of 'Well-Being'

2.1 The Concept of Well-Being

A Towards the close of the 20th century, positive psychology experienced a rapid expansion, and the study of well-being started to take centre stage. From a philosophical perspective, describe the feeling of well-being. Generally speaking, it has two orientations. One is a psychological feeling of well-being based on realisation theory, while the other is a subjective experience of well-being based on hedonism [16]. The primary driver of achieving subjective well-being is that people have more good feelings and subjectively feel happier, with a focus on self-evaluation. Psychological well-being is more concerned with developing one's potential through unremitting efforts, personal growth, or satisfying one's own value needs. The psychological meaning of the sensation of well-being is highlighted by the psychological sense of well-being. A variety of psychologists have developed various explanations and summaries of psychological well-being through the in-depth research of this topic. Waterman [17] believes that the acquisition of psychological well-being is the experience of realizing self-potential by fully devoting individuals to activities that best match their deep values and fully expressing themselves [3]. Additionally, he refers to "personal presentation," which is Waterman's theory of personal presentation, as the psychological condition in which a person experiences the satisfaction of exhibiting his true self flawlessly. He created the Personality Development Questionnaire for empirical research. Self-realization, an experience where autonomy, competitiveness, and relatedness are satisfied, is how Ryan defined psychological well-being [12].

2.2 Related Research on Psychological Well-Being

Subjective well-being and psychological well-being are two terms used to describe feelings of wellbeing that are based on hedonism and realisation theory, respectively. The

individual's good and timely experiences and sentiments are highlighted by their sub-jective sense of well-being. Psychological well-being places more emphasis on the psy-chological stability attained by the person via attempts to recognise their own value. The connection between subjective well-being and psychological well-being was initially studied by Ryff and Waterman [13][17]. They discovered a connection between psycho-logical and subjective well-being, two ideas that are separate but related to one another. Ryff found through research that the two dimensions of happiness and life satisfaction in subjective well-being are moderately correlated with the two dimensions of self-acceptance and situational grasp in psychological well-being [17]. Subjective well-being was weakly correlated with life goals, good relationships, independence, and personal growth. Corey used structural equation modeling to analyze the relationship between the two and concluded that situational grasp and self-acceptance in psychological well-being [2].

These two dimensions are also measures of subjective well-being [2]. In-depth research on the sense of well-being can provide a theoretical basis for improving the sense of well-being of individuals and the whole society and point out the direction of the practice.

2.3 Influencing Factors of Psychological Well-Being

Everyone aspires to be as happy as possible. A fulfilling self-realization leads to a happy experience known as mental well-being. People are becoming more and more interested in discovering their own worth. As a result, research into the variables that affect psychological well-being has been given focus [16].

(1) Demographic Variables
The existing research on the influence of demographic variables on psychological well-being found that the predictive effect of the demographic variables on psychological well-being was not significant. However, there are certain distinctions between age and gender and psychological well-being. The independence and situational comprehension of people of different ages are not significantly different, but four dimensions—personal growth, excellent relationships, life purpose, and self-acceptance—are significantly dif-ferent. The psychological well-being of young people is greatly affected by the level of education, work, or study. Regarding gender, adults of different genders have signifi-cant differences in self-acceptance, independence, personal growth, and life goals, with males significantly higher than females.

(2) Personality
There is a significant correlation between the Big Five personality and psychological well-being. Personality has a significant predictive effect on psychological well-being, especially agreeableness has high predictability for all dimensions of psychological well-being. Rigorousness and self-acceptance in psychological well-being, situational grasp and life objectives were strongly inversely associated across all three dimensions. Only self-acceptance, situational awareness, and pleasant interpersonal relationships are sig-nificantly positively connected with extraversion. The relationship between neuroticism and situational awareness and personal development was highly good. The relationship

between openness and several aspects of psychological well-being, however, was not statistically significant. The personality traits of activity, rigour, tenacity, and agreeableness were all significantly positively linked with and favourably influenced psychological well-being. Rigor is a major predictor of psychological well-being [13], and neuroticism has a large negative association with it [16]. There is no denying that personality both predicts psychological health well and influences it to some extent. As a relatively stable personality trait, self-esteem has a greater impact on psychological well-being.

(3) Social Support

The total score of social support and its dimensions and the total score of psychological well-being and most of its dimensions. There is a significant correlation between them, and social support is an important predictor of psychological well-being and can affect psychological well-being. In addition, social support also had a strong positive predictive effect on subjective well-being. The more social support a teacher receives, the more it shows that he has good interpersonal relationships, is good at seizing opportunities to achieve self-worth and life goals, the stronger the ability to control the environment, and the stronger the psychological well-being. Many factors affect psychological well-being. Self-efficacy, interpersonal relationships, parenting style, life goals, emotions, attention, and stress all impact psychological well-being. The study of the variables that affect psychological well-being is helpful in developing a theoretical framework for enhancing the country's psychological health as well as offering practice-oriented direction.

Based on the factor of social support [16], the studies of students' well-being always focus on the school environment, including the influence of teachers' behaviors and teaching technologies on students' well-being.

3 The Basic Connotation of MOOCs

3.1 Development of MOOCs

In 2008, Stanford University launched the first free online training website in the United States and responded positively to the call. The platform has added more than ten courses and received a good social response. In 2011, Jim Groom and Lisa M. published the Lean Innovation Digital Storytelling Lesson, Expressing Yourself in Stories and Using Digital Media to Tell Stories.

Stanford University professor Sebastian Throne moderated a discussion on the course; research and development directly enhanced the overall impact of MOOCs and introduced the theme of "Introduction to Artificial Intelligence," which greatly increased the number of students studying. He created a MOOCS website after finishing school and carried on his research after that. Mike Sokolski and David Starkins from Stanford have joined Udacity. The idea is to make the world's top online training resources available to everyone so that anyone may study anything they desire online. The launch of the Udacity website drew a lot of attention, marked a significant turning point in the evolution of MOOCs, and everyone was enthusiastic about the future of MOOCs. The Coursera website was founded in April 2012 by Stanford University students Daphne

Caller and Andrew NG. Harvard University and the Massachusetts Institute of Technology together created ATX in May 2012. Since then, the MOOCs has established three main sites and actively conducted online courses in various countries, which quickly spread widely. In the same year, 2012 was selected by the New York Daily as the first year of MOOCs.

3.2   Definition of MOOCs

Brian Alexander pointed out that MOOCs stands for "Comprehensive Online Open Course," which is an online open course for the whole society; Dave Gomer also agrees with this explanation. Stephen Downs and George Simmons discussed rotation theory and online debate and concluded that this idea needs to be followed and endorsed [8]. A recent development in online education and teaching is the MOOCS. In addition to online education, it offers a few special benefits. On Wikipedia, the term "MOOCS" is constantly changing. Wikipedia's current definition of a MOOCS is: "MOOCS is the latest online training based on reform "model," huge open online classroom, online classroom for the public, individuals can take online courses on the Internet." People from various walks of life are also becoming interested in the newest version of the new MOOCS online resource. With the help of a MOOCS, students can study whenever they choose, from any location, over an extended period of time. The main function of MOOCS is to spread the teaching essence of well-known MOOCS teachers. Editing a well-known school videotape and managing teachers through timely feedback and communication have all contributed significantly to raising teaching standards, advancing educational reform, and enhancing the teaching management system. The MOOCs, a well-known innovative online learning format, also serves a crucial reference purpose for conventional online instruction. The definition of the MOOCs notion in this situation is extremely significant. The prominent publisher Wiley has the following opinions about MOOCs: MOOCs have never had a clear definition, which frequently has an impact on future resource sharing and openness [8]. It is believed that with the widespread dissemination of MOOCs, the positioning of MOOCs will be more complete.

4   The Relationship Between Students' Well-Being and Chemistry MOOCs

4.1   The Role of Digital Technology in Students' Well-Being

The previous studies shows that, there might be both positive and negative results, coming from using digital technology, to students' well-being [10]. From the negative perspective, the overusing of digital technology for adolescence might lead to emotional problems of children, because of lacking of family time, and to physical health problems, and even to a kind of digital divide [10]. From the positive perspective, aligning digital technology with teaching methods might provide a more vivid learning environment to students and more learning ways, such as TV programming, e-books and MOOCs, etc. [10]. This study focus on the influence of digital technology, MOOCs, on students' well-being. In other words, because of just referring to the school environment, the negative effects might be avoided.

Table 1. Students' Responses after Learning using digital media CR [1].

No	Question Concerns	Yes (%)	No (%)
1	Students' fondness for English after learning using digital media	98	2
2	Students' difficulties in using digital media to learn English	25	75
3	Students' easiness to understand the message of an activity after watching a short movie using digital media	97	3
4	Students' easiness in retelling activity using English after watching a short movie using digital media	83	17
5	Students' difficulties in pronouncing a short text after watching and listening a dialogue using digital media	40	60
6	Students' motivation in learning English using digital media	90	10
7	Students feel in control of their learning using digital media	93	7
8	Students feel could work at their own pace	90	10
9	Students feel it is easier for them to review course materials as often as they wish because of using digital media	80	20
10	Students feel it is easier for them to be successful in their English classes after learning using digital media	86	14

4.2 Related Empirical Research of Using Digital Technology in Teaching and Learning

According to Venny's researches, using digital technology appropriately in English Language teaching and learning at an environment of English as the second language might help to enhance students' well-being [9]. Especially, it refers to reduce students' learning anxiety which comes from cultural stress and academic difficulties. The following table, based on the semi-structured interview of 117 students, shows the study result (Table 1):

Besides, some other researches show the positive correlation between students' motivation and learning consequence. For example, there is an qualitative research by Li and Canelas shows that, stimulating students' motivation of learning might help to enhancing the learning consequence which is an significant factors of students' well-being [6]. Furthermore, it heights the important role of MOOCs on stimulating students. It means that, MOOCs, a kind of self-regulated learning method, improves the learning interests of students, because they are derived by themselves rather than teachers or parents [6].

Above all, there are studies try to explore the relationship between students' well-being and MOOCs, but few of them focus on students' well-being in chemistry MOOCs in secondary school. The reasons why focus on chemistry MOOCs is, on the one hand, there is universality of this study, because chemistry is a compulsory module for all adolescence during the fundamental learning period; on the other hand, there is high matching attribute between the subject and MOOCs, especially from the perspective of visuality and vitality. Thus, the following focus on the aspects how MOOCs improving students' well-being.

4.3 The Role of Students' Well-Being in Chemistry MOOCs
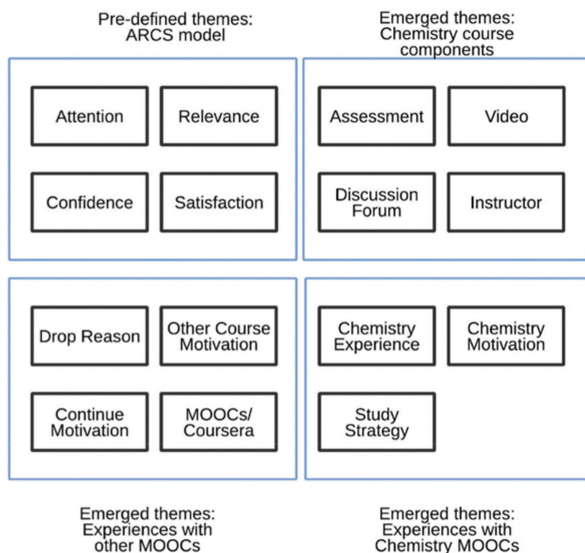
4.3.1 Power Function

Motivational function refers to the sense of well-being as students' behavior in classroom learning. In chemistry learning, students are more motivated to learn, and the sense of Well-being acts as a learning incentive. The chemistry classroom teaching process has an increasing effect on students' learning activities. Modern Tunnel Science Research Qiao pointed out that emotion is not only an attitude experience produced in human practice but also directly influences human behavior. Then in chemistry teaching, positive emotions help start classroom teaching, and a sense of well-being will help strengthen students' learning motivation in science chemistry classrooms. Sukhomlinsky believes that "if teachers are eager to impart knowledge without trying to make students feel emotionally high and intellectually excited, then this knowledge can only produce indifference, but not emotion mental work brings fatigue [15]." When introducing new courses, excellent chemistry instructors always get their pupils emotionally prepared, inspire them to work towards learning objectives, and give them the freedom to begin investigating knowledge in the context of their well-being. The MOOCs video screen can better and more safely enable professors to display students the experimental phenomenon of "fire tree silver flower" in the classroom where students are learning about the substitution reaction of metals so that students can experience the beauty of chemistry in aesthetics. They can't help but have a big impact on how experimental phenomena arise. Interest, then introduce the experimental principles, deepen students' understanding of iron replacing copper and copper replacing silver in the natural transition, enrich themselves in the enjoyment of aesthetic well-being, and extend the well-being in the classroom to after class [1].

4.3.2 Adjustment Function

The organisational effectiveness of students' feelings of wellbeing on their cognitive processes in chemistry class instruction is referred to as the moderating function. Happiness, interest, and delight are examples of positive emotions that generally support pupils' cognitive operation tasks. After students' positive emotions are passive, teachers must also pay attention to exerting their sense of well-being to the whole chemistry classroom teaching [5]. The maintenance and regulation of the process make a chemistry class based on the stable emotional experience of well-being from beginning to end.

4.3.3 Migration Function

Human emotion has a phenomenon of migration. A person's emotion towards something or others will migrate to the object related to it. We call this the migration function of emotion. The classic example of this emotional migration phenomena is "Love House and Wu." The technique of emotional migration in teaching chemistry involves teachers deftly evoking specific favourable emotions in students during the instructional process and transferring those emotions to the pertinent chemistry teaching content to give them comparable emotional colors. To make the MOOCs recording of the chemistry lecturers more enjoyable for the students, emotive hues have been added. For example, multimedia

Table 2. First-level node structure CR[2].

Pre-defined themes: ARCS model

| Attention | Relevance |
| Confidence | Satisfaction |

Emerged themes: Chemistry course components

| Assessment | Video |
| Discussion Forum | Instructor |

| Drop Reason | Other Course Motivation |
| Continue Motivation | MOOCs/Coursera |

Emerged themes: Experiences with other MOOCs

| Chemistry Experience | Chemistry Motivation |
| Study Strategy | |

Emerged themes: Experiences with Chemistry MOOCs

technology shows the beautiful blue sky and blue sea in Zhanjiang, and accompanied by elegant and sweet music, a bunch of goo suddenly appears in the depths of the sea. Addicted to bubbling mud, it looks like a piece of ordinary ice, but it catches fire with a match. Then it is naturally introduced that this is a kind of "combustible ice," which is a transparent crystal formed by natural gas such as methane gas encapsulated in water molecules after passing through the low temperature and high pressure of the seabed. It is a new and efficient new energy source for human beings. With great curiosity, students can't wait to explore the "strange" gas. With the slow discovery and learning, the students' exploration achievements make their joy beyond words. Teachers talk about the structure and chemical properties of methane in the strong curiosity of students.

In other words, migration function might be described as a visual factor which is useful to improve students' imagination, improving their happiness in learning. Based on the interview of 46 participants, Li and Canelas explored learners' perceptions of chemistry MOOCs by the following model [6] (Table 2):

Focusing on the part of chemistry course components, videos used at chemistry MOOCs is praised by 33 interviewees. Because, on the one hand, by using visual technology to improving learners' imagination, it might help to build the connection between the acquired knowledge of learners and the unknown area [6]. On the other hand, all of the 33 participants expressed that MOOCs might enhance the communication between teachers and students by using a stylus and video kit to write and draw on slides [6]. It contributes to building an open climate in classroom, improving students' well-being. Thus, considering migration function is significant for improving students' well-being in chemistry MOOCs.

5 Conclusion

This study focuses on the connection between digital technology, particularly MOOCs, and students' well-being. After explaining the researches status of well-being and MOOCs, the study explored the positive influence of using digital technology in education. Then, highlighting that applying MOOCs to secondary school chemistry teaching might help to improving students' well-being. Because there is positive correlation among students' motivation, learning consequence, and students' well-being. Thus, with concluding of the status quo of well-being and digital technology, this study can provide a theoretical background for the future studies which trying to improving students' well-being in chemistry MOOCs, and even both enriching new digital technology and enhancing students' well-being in education.

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