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Reshaping physical education curricula through the outcome-based education philosophy

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ABSTRACT

In the contemporary educational landscape, the outcome-based education (OBE) philosophy has emerged as a pivotal approach, emphasizing the achievement of specific outcomes in the learning process. This study delves into the intricate relationship between physical education assessment methodologies for university students under the OBE framework and their subsequent social adaptability. This study used a sample of 100 physical education elective students from Qilu Normal University. It employed experimental and questionnaire methods to measure the effects of OBE-driven physical education assessment. Preliminary findings suggest a positive correlation between holistic assessment techniques, which consider physical prowess and cognitive understanding, and enhanced social adaptability among students. This adaptability was measured in teamwork, conflict resolution, and interpersonal communication. The study underscores the potential of the OBE philosophy in reshaping physical education curricula, making it more aligned with the broader objective of holistic student development. Further research is recommended to explore the long-term impacts of such assessment methods on students' post-university life and career trajectories.

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1. INTRODUCTION

In 21st-century pedagogy, we are confronted with unparalleled challenges and opportunities. With the acceleration of globalization, technological advancements, and societal metamorphosis, educators and scholars are increasingly aware that conventional pedagogical approaches may no longer satiate the difficulties of contemporary society. Specifically, the rapid proliferation of technology necessitates educators to rejuvenate their instructional methodologies and apparatuses [1] perpetually; the heterogeneity of student demographics presents challenges in catering to diverse academic requisites; the ascension of online education concurrently raises quandaries regarding the assurance of pedagogical quality [2], constraints in resources and socio-economic pressures have also levied novel demands upon the educational infrastructure. In pursuit of optimally cultivating students and equipping them to navigate this rapidly transmuting world, the academic community has embarked on a quest for novel educational philosophies and methodologies [3].

In this context, outcome-based education (OBE) philosophy has emerged. OBE accentuates student learning outcomes, distinct from traditional content-centric pedagogical strategies. It delves beyond mere knowledge acquisition, encompassing skills, attitudes, and values. Under this pedagogical paradigm, the

social adaptability of university students is perceived as a pivotal learning outcome [4]. Social adaptability transcends mere vocational prospects, encompassing the art of forging and sustaining relationships, conflict resolution, and locating one's niche within a diverse societal tapestry. The ultimate objective of this instructional approach is to hone students' capabilities, enabling them to adeptly apply their learnings in the real world, thereby equipping them to navigate the vicissitudes of the job market and the pressures of rapid socio-economic evolution [5]. Physical education plays an instrumental role in the holistic development of students. It augments their physical well-being and fosters teamwork, leadership, and conflict-resolution skills [6]. However, traditional physical education evaluations have predominantly focused on physical prowess, often overlooking psychological and social maturation [7].

The OBE philosophy offers a rejuvenated perspective on physical education. It advocates for educators to perceive student development from a more expansive vantage point, encompassing physical capabilities and cognitive, emotional, and social facets [8]. Such a comprehensive evaluation approach potentially offers a more authentic reflection of students' capabilities, facilitating their seamless integration into university life and societal adaptation in subsequent phases.

This study selected a cohort of 500 university students from different backgrounds to explore this topic. Employing qualitative and quantitative research methodologies, we conducted an in-depth analysis of their physical education evaluations and social adaptability within the OBE framework. Through this research endeavor, we aspire to furnish invaluable insights for educators and policymakers, aiding them in comprehending and implementing the OBE philosophy, thereby catalyzing pedagogical innovation and progression. In essence, the OBE philosophy proffers a fresh pedagogical lens, prompting us to re-evaluate the objectives and methodologies of education. In this era of rapid flux, there's an imperative for continuous innovation and advancement to meet the demands of both students and society. This research marks merely the commencement of a protracted journey, and we eagerly anticipate collaborating with a broader spectrum of scholars and educators to chart the future trajectory of education.

2. LITERATURE REVIEW

2.1. The core concepts of the outcome-based educational theory

Outcome-based education epitomizes an educational philosophy that accentuates student learning outcomes over the instructional process. Research by Spady delineated OBE as a student-centric learning modality, wherein the quintessence of education is to ensure students attain predefined learning outcomes [9]. These outcomes transcend mere knowledge and skills, encompassing attitudes, values, and behaviors. OBE through OECD's DeSeCo initiative and its subsequent project (OECD Education 2030), has further underscored the significance of practical knowledge, moving beyond the traditionally emphasized theoretical knowledge [10]. Furthermore, a cardinal tenet of OBE posits that the success of education should be predicated on the competencies students genuinely acquire rather than their classroom performance or the duration of their engagement. This resonates with previous research [11], which delved into innovative university instructional models under the OBE paradigm and emphasized the ramifications of affective behavioral shifts on the OBE concept.

2.2. Divergence between outcome-based education and traditional pedagogy

Amidst the COVID-19 pandemic, in juxtaposition with traditional face-to-face education, the amalgamation of online instruction with offline OBE in a blended online-offline instructional model was more adept at stimulating students' faculties of recall, comprehension, and analytical prowess, as opposed to faculties of application, evaluation, and creative cognition [12]. Xiaoshu [13] elucidated in his research that vocational English pedagogical reforms, predicated on the "OBE" philosophy, to augment vocational students' proficiency in English application, are centralized around vocational English practical competencies. Through qualitative and quantitative measurements via unit tests and curricular projects, there was a palpable enhancement in students' penchant for autonomous learning and self-regulation. This signifies a transcendence and rupture from traditional instructional and learning modalities, facilitating students' cognitive, affective, and skill-oriented objectives. Rahayu *et al.* [14] probed the disparities between OBE and traditional instructional paradigms from an evaluative perspective. Conventional EFL evaluations were architected utilizing a bottom-up approach. Educators initially crafted micro-learning tasks, such as quizzes and assignments, formulating terminal tasks like mid- and end-of-term assessments/projects. The emphasis is squarely placed upon the ultimate outcomes within the OBE milieu.

Consequently, the development of evaluations adheres to analogous principles. Educators commence by formulating and architecting the terminal evaluations. Post this, smaller measures can be logically designed and progressively implemented. Traditional evaluative techniques might be incongruent with learning objectives, culminating in nebulous student learning outcomes [14]. Additionally, OBE accentuates continuous evaluations and feedback to ensure students achieve the stipulated learning outcomes.

In a study conducted at the Norwegian University of Life Sciences, despite the adoption of a novel OBE-centric curricular structure, the research still discerned significant disparities in examination outcomes between students with numerical preferences and those with situational inclinations, as well as those possessing sensory-based rather than thought-based personality traits [15].

2.3. Global implementations of outcome-based education

Outcome-based education has witnessed extensive adoption across the global academic landscape. Research by Jin and Tian [16] delved into the practical application of the OBE-driven flipped classroom instructional model within the "energy storage technology" course. They architected a student-centric, outcome-oriented instructional paradigm, and predicated upon this model, established an evaluative system centered around process assessment phases and a pedagogical reform feedback mechanism [16]. Using tangible pedagogical practices, Li *et al.* [17] proposed integrating the OBE educational philosophy into the curricular reform of the applied undergraduate course "data structures and algorithms". They scrutinized the reformative approaches of the preparatory phase of practical instruction from four facets: talent cultivation plans, practical instruction syllabi, practical instruction faculty, and practical instruction materials [17]. Zhang and Fan [18] assessed the efficacy of OBE within the "workplace communication" course at Guangdong Ocean University, substantiating that the OBE methodology can bolster undergraduate students' communicative competencies. Pan *et al.* [19] explored the flipped classroom modality of the "mixed unit operations" course, underpinned by the OBE philosophy. Through the implementation of instructional task lists, pedagogical videos, instructional presentations, classroom instruction, and instructional summations, they cultivated students' penchant for autonomous learning. They ignited their academic fervor for mixed unit operations [19]. These exemplars underscore that OBE is perceived as a potent educational methodology, capacitating students to adeptly navigate the challenges of the 21st century.

2.4. Antecedent research on the correlation between physical activity and social adaptability

Li [20] postulated that social adaptability had become a pivotal metric in gauging the caliber of vocational college students. Consequently, physical education pedagogy should emphasize fostering students' social adaptability [20]. Sun and Kim [21] probed the training modality of sports application-oriented talents from an emotional regulation perspective. They introduced a university-oriented talent cultivation model by juxtaposing foreign university models with local economic development interaction paradigms. A correlative analysis between production and educational modalities revealed a significant correlation between production and educational models, emotional coping, psychological resilience, and anxiety [21].

Wu and Liu [22] delved into the ramifications of physical education on university students' psychological well-being and social adaptability by establishing deep learning models. They identified a pronounced correlation in structure, quality, and level between the demand and supply of health talents oriented towards physical and psychological sports services. Compared to the general populace, individuals who have undergone physical education exhibited a diminished risk of psychological impediments, such as anxiety and depression [22]. Additionally, physical education augments students' social competencies, facilitating positive interpersonal relationships, fostering amicable affiliations with peers, mitigating social impediments, inculcating a spirit of teamwork, and bolstering students' self-assuredness. This heightened confidence equips them to adeptly navigate life's challenges and tribulations [23]. These studies underscore the instrumental role of physical activities and education in enhancing students' social adaptability.

The OBE educational philosophy has garnered extensive attention and adoption on a global scale. It diverges from traditional pedagogical methodologies, particularly emphasizing student learning outcomes and tangible competencies. Concurrently, the intimate correlation between physical activity and social adaptability has been substantiated, furnishing a theoretical foundation for applying OBE within physical education. Nonetheless, OBE also confronts certain critiques and challenges, necessitating further exploration and resolution by educators and researchers alike. In the ensuing segments, we shall delve deeper into this study's methodological underpinnings and discoveries and their implications for educational praxis.

3. METHOD

3.1. Research design

This study employs a quasi-experimental research design with pre-test and post-test evaluations. The objective is to compare the social adaptability of students tested using an outcome-oriented collegiate physical education assessment method versus those tested using a traditional physical education assessment method. The study is divided into the outcome-based education assessment group (OBEG) and the traditional education assessment group (TEG). Predictions were made regarding the students' social adaptability. The grouping outcomes were verified using an independent t-test before the experiment to ensure no

significant differences between the groups. Both groups underwent an experimental term lasting one semester (16 weeks, once a week).

3.2. Participant

The research subjects are Qilu Normal University college students who have enrolled in the "physical education-1" elective course aged between 17 and 19. They are physically healthy and have no history of mental illnesses or psychological disorders, totaling 137 individuals. The sampling technique employed is proportional random sampling, executed using a sampling formula. Based on this formula, a sample of 100 individuals was obtained. Subsequently, based on their self-assessment scores for social adaptability, they were grouped into matched ordinary pairs. These participants epitomize the vast student populace of Qilu Normal College partaking in physical education electives, thereby ensuring the universality and representativeness of the research outcomes.

3.3. Instrument

3.3.1. Chinese version of the social adaptation self-evaluation scale

The instrument employed in this study is the social adaptation self-evaluation scale (C-SASS), tailored for the Chinese population. Its validity stands at 0.930, and its reliability is 0.940. The scale encompasses 20 single-choice questions. Researchers assigned scores to the options of these questions, and based on students' cumulative scores, their social adaptability was categorized into four levels: strong, relatively strong, average, and below average as shown in Table 1. Thus, to ensure the scientific integrity of the measurement results, the specific point values of the questions were not disclosed to the students during the experiment. All collected data were subjected to descriptive analysis techniques, preliminary tests for data normality and homogeneity, paired-sample t-tests to examine intergroup differences, and independent sample t-tests to evaluate differences between groups.

Table 1. Social adaptability level classification standards

Level	Score	Analysis
Strong	49-60	Possesses a robust social adaptability. Can swiftly acclimate to new learning, working, and living environments. Interactions with others are relaxed and gracious, leaving a favorable impression. Regardless of the setting, one can navigate situations with aplomb.
Relatively strong	37-48	Demonstrates a commendable adaptability. Capably adjusts to environmental changes, maintains a proactive attitude, and is eager to engage with the external world, showcasing significant adaptability.
Average	25-36	Adaptability is considered average. Upon entering a new environment, one can generally adapt after a period of concerted effort.
Poor	Below 20	Adaptability is somewhat lacking. It's imperative to consciously cultivate one's abilities in this domain during future studies, life, and work to enhance psychological resilience and adaptability.

3.3.2. Course experience questionnaire

Additionally, this study devised a questionnaire to understand better students' experiences in physical education courses, their learning outcomes under the order of OBE philosophy, and their social adaptability. It was distributed digitally to a total of 100 participants. The response rate was 100%, with a validity rate of 96.6%. A subjective evaluation method was utilized to assess the structure and content of the questionnaire, and relevant experts were consulted for feedback. Based on the insights and recommendations, refinements were considered. Subsequently, an expert panel conducted a qualitative assessment of the survey. As indicated in Table 2, the questionnaire meets the requisite validity standards. While this study endeavored to consider various factors holistically, certain limitations might persist due to constraints in time and resources, such as potential biases in sample selection and inaccuracies in self-reported data.

Table 2. Expert form results

Conclusion	Feasible	Basically feasible	Suggest changes	Not feasible
Number of people	3	6	1	0

4. RESULTS AND DISCUSSION

4.1. Data description and preliminary test

The students from the OBEG and the TEG exhibited differences in their scores before and after the tests, as illustrated in Table 3. The post-test scores for social adaptability were higher than the pre-test scores. A normality test using the Kolmogorov-Smirnov formula was executed to ascertain if the analyzed data followed a normal distribution. Similarly, the homogeneity of the data distribution was verified through a homogeneity test. The results indicated that pre and post-test data were normally distributed, as evidenced by

a significance value (sig.) of ≥0.05. Levene's test was employed for the homogeneity assessment, revealing a homogeneous data distribution with a significant value of 0.200 (≥0.05).

Table 3. A summary of the pre-test and post-test data on social adaptability for both groups of students

Groups	Test	N	M	SD
OBEG	Pre	50	37.76	9.16
	Post		46.85	6.01
TEG	Pre	50	36.94	8.36
	Post		41.98	9.65

4.2. The impact of physical education evaluation under the outcome-based education philosophy on the social adaptability of college students

The analysis results from Table 4 indicate that there is a significant difference between the pre-test and post-test physical fitness scores of students in the OBEG ($p<0.01$). The post-test scores increased by 9.09 points compared to the pre-test. This suggests that the outcome-oriented physical education assessment has a significant impact on enhancing students' social adaptability. For students in the TEG, there is also a significant difference between the pre-test and post-test physical fitness scores ($p<0.01$), with the post-test scores increasing by an average of 5.04 points compared to the pre-test. This implies that the traditional physical education course assessment method also significantly influences the improvement of students' social adaptability. A depiction of the analysis results is shown in Figure 1.

Researchers also used an independent t-test to compare the post-test scores of social adaptabilities between the two groups of students. The analysis results showed that there was a significant difference ($p<0.01$) in the post-test data between the OBEG and the TEG. This indicates that the outcome-based physical education assessment method is more effective in improving the social adaptability of college students.

Table 4. Differences in social adaptability scores before and after testing among the two groups of students

Groups	Test	N	M	SD	t	Sig.
OBEG	Pre	50	37.76	9.16	49.807	0.000
	Post		46.85	6.01		
TEG	Pre	50	36.94	8.36	41.647	0.000
	Post		41.98	9.65		

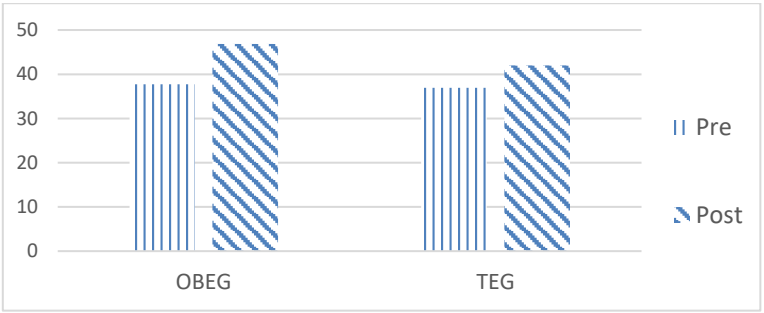

Figure 1. The analysis results of students' social adaptability

4.3. Outcome-based physical education assessment methods

As shown in Table 5, Qilu Normal University currently adopts a diversified evaluation method for university physical education [24], which includes formative evaluation, performance-based evaluation, and summative evaluation [25]. These three evaluation methods are closely linked to the OBE philosophy [26]. Formative evaluation focuses on students' learning process and participation, aligning with the continuous and autonomous learning in OBE; performance-based evaluation assesses students' performance in actual tasks, reflecting OBE's emphasis on students' practical application skills; summative evaluation directly corresponds to the core of OBE, evaluating whether students have achieved the predetermined learning outcomes [27].

Compared to traditional evaluation methods, the diversified evaluation better meets the requirements of the OBE educational philosophy [26]. It not only focuses on students' knowledge acquisition but places more emphasis on skill development and practical application [27]. As indicated in Table 1, each type of

evaluation is assigned a corresponding weight, with performance-based evaluation accounting for 60% of the final physical education score [24]. The emphasis on the results of performance-based evaluation complements the findings of the aforementioned experiment, as the improvement in students' practical skills also enhances their ability to adapt to future work [25]. This evaluation method encourages comprehensive student development, fostering critical thinking, teamwork, and problem-solving skills, perfectly aligning with OBE's objectives. In summary, the diversified evaluation method provides strong support for implementing the OBE educational philosophy, contributing to better cultivating students' comprehensive qualities and abilities.

Table 5. Qilu Normal University's physical education assessment methods

Evaluation method	Evaluation content	Weight	Assessment/evaluation criteria
Formative evaluation	Classroom learning	0.2	Evaluation based on classroom performance such as answering questions during class, enthusiasm in skill practice, and participation in practical teaching.
Performance-based evaluation	Skill demonstration	0.4	Utilizes a combination of skill benchmarking and technical evaluation, primarily focusing on technical assessment but necessitating the attainment of a minimum athletic score.
	Choreography Presentation	0.2	In a collaborative group setting, devise a popular aerobics routine. The choreography must encompass at least 4 poses and 8 formations and be showcased.
Summative evaluation	Final examination	0.2	The final examination is conducted in an open-book format.
Composite score		1	Formative evaluation×0.2+performance-based evaluation×0.6+summative evaluation×0.2

4.4. Student course experience questionnaire analysis

Table 6 shows the OBEG satisfaction level towards university physical education guided by the OBE philosophy has significantly increased after a semester-long experiment. This rise can be attributed to the various advantages of OBE. Firstly, OBE clarifies the objectives of learning, allowing students to understand the purpose of their studies more clearly [28]. Secondly, it permits personalized teaching, emphasizes practical application, encourages autonomous learning, and provides continuous feedback. Additionally, OBE stresses holistic student development and motivational mechanisms, with its flexible teaching model catering to different students' varied learning paces and styles [29]. These factors have contributed to a surge in students' satisfaction with the course, from 24% in the pre-test to 72%. In contrast, the satisfaction level of the TEG towards the course is merely passable. Although the traditional educational model has its unique advantages, in this experiment, the proportion of students who were satisfied or above not only did not rise but decreased by 6%.

Moreover, 68% of students reported an increase in their confidence in social settings, attributing it to their OBE-centric physical curriculum. This is further reinforced by 84% acknowledging that teamwork skills acquired from physical education translated to other group settings or social contexts [30]. Such findings not only reaffirm the immediate objectives of OBE but also suggest broader, unforeseen benefits. Previous research [31] emphasized the role of team sports in fostering social skills, but our study highlights OBE as a potent medium for this.

Table 6. Teaching satisfaction

Group	Test	N	Satisfaction (%)			
			Very satisfied	Satisfied	Neutral	Unsatisfied
OBEG	Pre	50	4	20	56	20
	Post		16	56	16	12
TEG	Pre	50	10	16	50	24
	Post		10	10	40	40

4.5. Challenges in outcome-based education implementation

Despite the positive tilt, 12% of the respondents found the lessons slightly impractical. Additionally, concerns about aligning assessment techniques with OBE objectives, though raised by a minority, hint at areas that can be fine-tuned to optimize the OBE approach. Considering these concerns for comprehensive OBE adoption is imperative, echoing Nepal's sentiment on traditional physical education methods' alignment challenges [32].

5. CONCLUSION

The findings underscore the potential of OBE in fostering holistic student development. The positive correlation between OBE-driven physical education assessment and enhanced social adaptability, as evidenced by improved teamwork, conflict resolution, and interpersonal communication skills, is a testament to the philosophy's effectiveness. The increased satisfaction levels among students in the OBEG further validate the benefits of this approach.

Moreover, the study highlights the broader implications of OBE. Beyond the immediate academic context, the significant increase in students' confidence in social settings suggests that the skills acquired through OBE-centric physical education can be seamlessly transferred to other social contexts. This adaptability is crucial in today's rapidly changing world, where students must be equipped with academic knowledge and the skills to navigate diverse social landscapes. However, like any transformative approach, OBE is not without its challenges. Concerns about the practicality of lessons and the alignment of assessment techniques with OBE objectives indicate areas that require further refinement. It is essential to address these concerns to ensure the comprehensive and effective implementation of the OBE concept.

In conclusion, as the global educational community grapples with the challenges of the 21st century, OBE offers a promising path forward. By emphasizing tangible learning outcomes and fostering holistic student development, OBE has the potential to revolutionize physical education and, by extension, the broader educational landscape. This study marks a significant step in that direction and is hoped to serve as a foundation for further research and exploration in this domain.

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