



Developing ABCS Learning Media for Physical Fitness Activities of Junior High School Students

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Keywords

Development;
Learning Media;
Physical Fitness
Activities

Abstract

The lack of varied instructional media in Physical Education (PE) causes low student motivation and movement participation. This study aims to develop and test the feasibility of the ABCS (*Agility, Balance, Coordination, Strength*) learning media innovation. The approach used is Research and Development (R&D) adopting Sugiyono's methodology. Data evaluation involved feasibility validation by three experts (material, media, practitioner) and field trials on a small scale (67 students) and a large scale (173 students) using questionnaires. The results showed that expert validation reached an average of 93.33% (Very Feasible). During the field trial, implementation feasibility increased significantly from 84.29% (small scale) to 91.53% (large scale), with the highest increase in the affective aspect (91.94%). The use of four-color stimuli and integrated barcode tutorials successfully broke the monotony and boosted students' enthusiasm. In conclusion, the ABCS media is highly feasible and practical as a pedagogical solution to optimize physical fitness learning.

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p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

Physical Education (PE) is an integral part of the education system aimed at developing aspects of physical fitness, motor skills, and student character (Wang & Yang, 2025). One of the primary focuses of PE learning is the improvement of skill-related fitness, which encompasses agility, balance, coordination, and strength. These four components are essential in supporting students' daily physical activities as well as in mastering fundamental sports techniques. However, the achievement of these fitness objectives largely depends on the quality of the learning process and the availability of adequate facilities or instructional media that can stimulate students' motivation and active engagement (T. Zhang et al., 2025).

Based on the results of observations and preliminary studies conducted at several State Junior High Schools in the Kota Kudus District, fundamental problems were identified regarding the lack of innovation in learning media. Specifically, at SMP Negeri 1 Kudus, the absence of engaging instructional media and limited open space restrict students from optimally exploring their physical abilities. At SMP Negeri 2 Kudus, diverse student characteristics, ranging from introverted tendencies to gadget dependency, contribute to reluctance to engage in physical activity and low motivation in PE learning. Meanwhile, at SMP Negeri 3 Kudus, the utilization of available equipment remains suboptimal due to students' limited knowledge of and interest in the tools. In general, PE teachers in the field still rely on monotonous conventional media, which fail to stimulate students' enthusiasm and confidence to perform movements optimally.

Developmental research on modified sports equipment has been widely conducted to address issues related to student motivation and the effectiveness of Physical Education (PE) learning. For instance, the development of the BEPS (Balance, Explosive Power, Strength) tool proved effective in increasing students' interest in physical fitness materials through its engaging design (Wildan et al., 2020). Furthermore, research on the FBES (Flexibility, Balance, Endurance, Strength) This tool also demonstrated strong feasibility when implemented as a supporting instrument for group physical fitness activities. (Ilham Ramadhani et al., 2020). On the other hand, the SCAR (Speed, Coordination, Accuracy, Reaction) tool was developed with a primary focus on user-friendliness, increased student appeal, and structural durability (Pratama et al., 2020). Meanwhile, the EXPAS (Explosive Power, Agility, Strength) tool was specifically designed to facilitate the improvement of explosive power, agility, and strength through a series of structured movements such as jumping, zig-zag running, and push-ups (Azizi et al., 2020). Although these four innovations have made significant contributions, a novelty gap remains that has not been fully addressed.

To overcome these gaps and various obstacles in the field, a comprehensive learning media innovation is required (Liu & Zaman, 2025). Therefore, the researcher developed the ABCS (Agility, Balance, Coordination, Strength) learning media. This tool is specifically designed with the primary objective of holistically improving students' understanding of physical fitness (Fuentes-Lopez et al., 2026). Through the use of the ABCS tool, students do not merely perform repetitive movement routines but are facilitated in optimizing their psychomotor abilities through a series of obstacles that simultaneously train agility, balance, coordination, and strength. Moreover, this media innovation features a visualization of four striking colors (red, yellow, green, and blue) that function as cognitive stimuli to enhance students' interest and motivation in Physical Education learning (Newman et al., 2026). Particularly in physical fitness activity materials, the ABCS tool is expected to stimulate the enthusiasm of passive students, reduce their dependence on gadgets, and transform the learning process into an active and meaningful movement experience (Rose et al., 2026).

The novelty of the ABCS learning media lies in the simplification of its mechanical design and the optimization of motor functions across its four main aspects compared to previous models. In terms of Agility, the ABCS equipment is designed to be simpler and more practical by solely utilizing an iron goalpost frame, unlike the EXPAS model which uses galvalum zinc to cover the cross-section (Azizi et al., 2020). For the Balance aspect, ABCS is more optimal as it utilizes four sides simultaneously, whereas the BEPS model is limited to only one side (Wildan et al., 2020). Furthermore, in the Coordination aspect, the ABCS tool facilitates direct and dynamic student motor engagement through a combination of jumping over hurdles and throwing-catching a ball, rather than merely serving as a static target like the SCAR model (Pratama et al., 2020). Finally, for

the Strength aspect, the ABCS tool is developed with a specific and efficient focus on push-up and sit-up exercises, distinguishing it from the FBES model which incorporates pull-ups that require a more complex construction (Ilham Ramadhani et al., 2020).

Given the immense potential of the ABCS tool as a solution to various problems in the field, this study focuses on two main research questions: (1) how is the development model of the ABCS tool for teaching physical fitness to junior high school students? and (2) How suitable is the ABCS tool in supporting physical fitness learning activities for junior high school students? In line with these research questions, this study aims to: (1) produce a feasible developmental product in the form of the ABCS tool for teaching physical fitness activities to junior high school students, and (2) determining the level of suitability of the ABCS tool when applied in physical fitness learning activities. By achieving these objectives, the ABCS tool is expected to provide a practical learning innovation that helps students understand the material comprehensively, fosters appreciation toward learning activities, and supports an effective as well as enjoyable learning process (joyful learning) (Ndabaga et al., 2023).

METHODS

This study employed a Research and Development (R&D) approach. The procedure for developing the learning media referred to the research and development model proposed by (Sugiyono., 2021), which was simplified and adapted to the scope and needs of the study. The development procedure consisted of nine sequential steps: (1) identification of potential problems through observation, (2) data collection and needs analysis, (3) product design of the ABCS media, (4) design validation by experts, (5) design revision, (6) small-scale product trial, (7) product revision based on field findings, (8) large-scale field trial, and (9) final product revision.

The subjects of this study included expert validators, field practitioners, and junior high school students in the Kudus District. During the validation stage, the product was comprehensively evaluated by three parties: a learning media expert, a physical education (PE) material expert, and one PE teacher serving as a field practitioner (Mukarromah et al., 2022). Following product validation and initial revisions, the study proceeded to the field-testing stage. The small-scale trial was conducted at SMP Negeri 1 Kudus, involving a sample of 67 students. Subsequently, the large-scale trial was implemented across three schools, namely SMP Negeri 1 Kudus, SMP Negeri 2 Kudus, and SMP Negeri 3 Kudus, with a total of 173 participating students.

This study employed a Research and Development (R&D) design aimed at developing and implementing the ABCS learning media. The data collection instruments consisted of expert validation sheets and student response questionnaires, both of which were measured using a 4-point Likert scale (1-4) to avoid neutral response bias. The expert validation sheet was developed by adapting the guidelines from (Sugiyono., 2021) and (Saputri et al., 2023). This validation instrument comprised 20 question items evenly distributed 5 items each across four main assessment components: product quality, safety, utility, and feasibility. In addition to the quantitative assessment, the validation sheet was equipped with an open ended revision suggestion column for product improvement.

Meanwhile, the student response questionnaire was formulated based on Bloom's Taxonomy framework (Listiani et al., 2022). This questionnaire was designed with a total of 40 question items focusing on the evaluation of cognitive, psychomotor, and affective aspects. The score range of 1 to 4 on the student questionnaire sequentially represented the level of agreement: Strongly Disagree (SD), Disagree (D), Agree (A), and Strongly Agree (SA). Prior to data collection, the instrument underwent content validity testing by experts and reliability testing using Cronbach's Alpha. The statistical analysis yielded a Cronbach's Alpha coefficient of 0.86, indicating that the instrument possessed excellent internal consistency and was highly reliable (Acikgul et al., 2026).

Regarding field data collection, participants were selected using a total sampling technique, where the entire population of the designated classes was included (G. Zhang et al., 2024). The small-scale trial involved 67 students from SMP Negeri 1 Kudus to conduct an initial product usability evaluation. Subsequently, the large-scale implementation stage involved 173 students distributed across three schools (SMP Negeri 1, SMP Negeri 2, and SMP Negeri 3 Kudus). This specific population was chosen as research subjects because these three schools share

similar Physical Education curriculum characteristics but factually face challenges regarding the lack of varied learning media (Ade Rahayu, 2025). Therefore, this sample was considered highly representative to test the adaptability and feasibility of the ABCS media in the field.

The data analysis techniques applied in this study were quantitative and qualitative descriptive analyses. Quantitative data, derived from the scores of the validators' assessment sheets and the student response questionnaires, were converted into percentages using the descriptive percentage formula (obtained score divided by the maximum score, multiplied by 100%). The percentage results were then converted into qualitative feasibility criteria based on the established classification scale presented in **Table 1**.

Tabel 1. Feasibility criteria based on percentage scores.

Percentage	Category
81% - 100%	Very Feasible
61% - 80%	Feasible
41% - 60%	Fairly Feasible
21% - 40%	Less Feasible
<20%	Not Feasible

Qualitative data, consisting of feedback, critiques, and suggestions from experts, as well as field observations of students, were analyzed descriptively. These qualitative findings served as the primary basis for product refinement at each revision stage prior to finalization (Kikuchi et al., 2024).

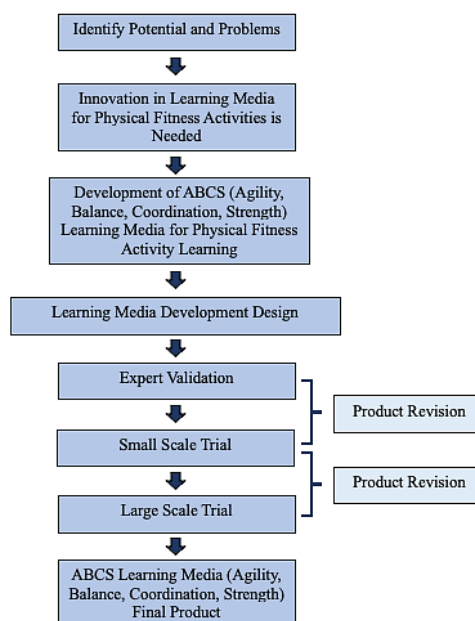


Figure 1. Research framework mind map.

RESULTS AND DISCUSSION

This section comprehensively outlines the empirical findings obtained from the Research and Development (R&D) process of the ABCS (Agility, Balance, Coordination, Strength) learning media. This innovation was developed as a pedagogical solution to the factual conditions at SMP Negeri 1 Kudus, SMP Negeri 2 Kudus, and SMP Negeri 3 Kudus, where the lack of variety in physical education (PE) learning media became a determining factor in students' low motivation and movement participation. Based on this urgency, the presentation of the results and discussion is designed to address the main research objectives through three structured topics: (1) a description of the specifications and functionality of the final ABCS media product, (2) the feasibility test results based on assessments by expert validators

and practitioners, and (3) the level of effectiveness of the media implementation in both small-scale and large-scale field trials.

The ABCS Learning Media Development Product

The ABCS learning media is an innovative supporting instrument specifically designed to optimize students' physical fitness learning activities. Based on the product design and validation stages, the physical appearance of the developed media can be seen in **Figure 2**. The following are the detailed specifications, functions, and usage mechanisms of the media:



Figure 2. The ABCS learning media.

The ABCS learning media is designed with durability as a primary consideration; therefore, the entire structure is made of strong and sturdy iron. The main support base uses a UNP 8 iron profile, while the obstacle hurdles are constructed from 1-inch iron pipes. These components are assembled using a locking system consisting of bolts and nuts. Dimensionally, the tool measures 250 cm in length, 70 cm in width, and 20 cm in height. The main advantage of this construction lies in the application of a knock-down system, which makes the tool highly portable, easy to transport, and practical to store.

Visually, the instrument is coated with four striking colors: red, yellow, green, and blue. The use of these colors is not merely for aesthetic purposes but is deliberately designed to provide psychological stimulation. These bright colors help break monotony, attract visual attention, and significantly increase students' interest and motivation during physical education learning activities.

The ABCS media accommodates four components of skill-related fitness implemented through various functional movement variations: (1) Agility, students train their agility by jumping over the hurdles sequentially, accompanied by dynamic changes in movement direction based on the teacher's instructions. (2) Balance, to train balance, students are instructed to stand on the hurdles and maintain their body posture for as long as possible without falling. (3) Coordination, coordination training is designed using a joyful learning approach involving movement activities combined with singing. This process integrates the use of the ABCS tool with additional media (such as a ball), where students are instructed to jump while accurately throwing and catching the ball. (4) Strength, the sturdy iron construction enables the tool to support students' body weight, making it suitable for muscle strength training. The hurdles can function as hand grips during push-ups or as foot supports when students perform sit-ups.

To ensure that the tool can be implemented easily and accurately, this product is equipped with technological integration. The researcher provides a user guide for the ABCS learning media, which includes a specific QR code that can be scanned by both teachers and students. The QR code links directly to a comprehensive video tutorial demonstrating the assembly procedures and proper usage of the ABCS tool in the field.

Expert and Practitioner Validation Results

Before the instrument was implemented in the field trial stage, the initial draft of the ABCS learning media product was comprehensively evaluated through expert judgment. This validation process involved three competent parties: a learning media expert, a physical education (PE) material expert, and a PE teacher acting as a field practitioner. The assessment focused on four main indicators: quality, safety, utility, and feasibility. The recapitulation of the assessment results from the three validators is presented in **Table 2**.

Table 2. Expert validation results of the ABCS learning media.

Validator	Validity (%)
Learning Media Expert	90.00
PE Learning Material Expert	97.50
PE Teacher (Practitioner)	92.50

Based on the data presented in **Table 1**, the validation results indicated highly satisfactory percentages from all validators. The highest assessment was given by the PE material expert, with a percentage of 97.50%. Meanwhile, the PE teacher, acting as a practitioner, gave a score of 92.50%, and the learning media expert provided a score of 90.00%. Based on the average feasibility criteria established in the methods chapter, these results place the ABCS media in the “Very Feasible” category.

This high validation percentage is directly correlated with the designed tool specifications. In terms of quality and safety, the use of a UNP 8 iron profile and a bolt-and-nut locking system was deemed by the experts to ensure the tool’s sturdiness when supporting students’ body weight, thereby minimizing the risk of accidents or injuries during exercise. In terms of utility and feasibility, the four-color design, which functions as a cognitive stimulus, coupled with the availability of a video tutorial accessible via QR code and a user guide, was considered highly helpful for teachers in presenting skill-related fitness materials in a more structured and engaging manner. With feasibility percentages consistently above 90% across all assessment indicators, it can be concluded that, theoretically and functionally, the developed ABCS media product is valid and highly feasible. Therefore, the media is ready to proceed to the field trial implementation stage without requiring major revisions.

The high feasibility of the ABCS media provides a crucial interpretive finding, a simpler sports equipment design can actually yield more optimal learning outcomes. Compared to previous studies, such as the EXPAS model (Azizi et al., 2020), which consumes significant space due to its galvalume zinc cover, or the FBES model (Ilham Ramadhani et al., 2020), which features a complex construction due to its pull-up elements, the ABCS framework is designed to be far more practical. Theoretically, this physical simplification is proven to significantly reduce the mechanical barriers that burden students, allowing them to move more freely and focus on the quality of core movements such as push-ups, sit-ups, and agility.

Furthermore, in terms of functionality, the ABCS tool resolves the spatial movement limitations found in the BEPS and SCAR models (Wildan et al., 2020);(Pratama & Sudarmono, 2020). ABCS no longer restricts balance training to a single support side (like BEPS) or merely serves as a static target object (like SCAR). Instead, the ABCS tool simultaneously optimizes all four sides to trigger dynamic student motor engagement such as the combination of jumping over hurdles, throwing, and catching a ball. These findings critically assert that the feasibility of physical education media is not determined by the complexity of its physical structure. The ABCS media is proven to be highly feasible because it successfully integrates an efficient mechanical design, instructional independence through barcodes, and psychological stimulation through colors, which collectively solve the problem of student boredom in the field.

Small Scale and Large Scale Trial Results

After the ABCS learning media product was declared highly feasible by expert validators, the next stage was to measure its feasibility and practicality through direct implementation with students. This field data collection was conducted in two stages: a small-scale trial and a

large-scale trial. The evaluation of student responses focused on three main domains of physical education (PE) learning: material understanding (cognitive), functional movement skills (psychomotor), and students' interest and attitudes (affective). The recapitulation of the results from both trial stages is presented in **Table 3**.

Table 3. Student response assessment results in field trials.

Aspect	Small-Scale Trial (%)	Large-Scale Trial (%)
Cognitive	85.44	91.78
Psychomotor	84.91	90.88
Affective	82.52	91.94
Average	84.29	91.53

Based on the data presented in **Table 2**, the implementation of the small-scale trial involving 67 students at SMP Negeri 1 Kudus showed highly positive results. The achievement percentages were 85.44% in the cognitive domain, 84.91% in the psychomotor domain, and 82.52% in the affective domain. Overall, the average student response at this stage reached 84.29%, which falls into the "Very Feasible" category. Despite meeting the maximum feasibility criteria, the researcher still conducted evaluations and minor improvements related to time management and tool usage instructions in the field to enhance the effectiveness of the learning process.

Following these adjustments, the product was implemented on a larger scale during the large-scale trial involving 173 students from three schools (SMP Negeri 1 Kudus, SMP Negeri 2 Kudus, and SMP Negeri 3 Kudus). The results of the large-scale implementation demonstrated a substantial improvement across all domains. Students' cognitive understanding increased to 91.78%, psychomotor movement skills rose to 90.88%, and the affective domain reached the highest percentage at 91.94%. The overall average in the large-scale trial reached 91.53%, which falls into the "Very Feasible" category.

The percentage increase from small-scale trials (84.29%) to large-scale trials (91.53%) indicates that the ABCS learning media demonstrated high feasibility, adaptability, and consistency when implemented in a wider and more heterogeneous population. Notably, the most substantial increase occurred in the affective domain (from 82.52% to 91.94%). This significant improvement can be scientifically explained through Color Psychology Theory and Self-Determination Theory (Newman et al., 2026). The implementation of a strategy of bright colors (red, yellow, green, and blue) in the ABCS equipment serves as a powerful visual stimulus that increases arousal, physiological, and cognitive attention. Theoretically, warm colors (red and yellow) have been shown to generate energy and excitement, while cool colors (green and blue) improve focus during motor tasks (Schweder et al., 2026). Additionally, the integration of video tutorials accessible via QR codes contributes to the acceleration of students' cognitive understanding of movement instructions, which further supports more accurate and feasible execution of psychomotor skills (agility, balance, coordination, and strength).

CONCLUSION

Based on the results of the Research and Development (R&D) process, it can be concluded that the ABCS (Agility, Balance, Coordination, Strength) learning media innovation has been successfully developed and meets the "Very Feasible" criteria for implementation in Physical Education (PE) learning. This feasibility is empirically evidenced by the cumulative assessment from media experts, material experts, and field practitioners, which reached 93.33%. In terms of physical design, the knock-down iron construction, combined with the integration of a video tutorial accessible via QR code, has been shown to ensure safety, practicality, and students' instructional understanding.

In addition, direct application of the product in the field shows high feasibility in improving the quality of learning. There was a substantial increase from the small-scale trial results (84.29%) to the large-scale trial (91.53%). The most notable finding of this study was the marked improvement in the students' affective domain (reaching 91.94%). These findings

indicate that the four-color visualization of the ABCS tool is functional and feasible as a psychological stimulus that reduces boredom and increases students' engagement, interest, and motivation to move during learning activities. Based on these conclusions, it is recommended that PE teachers adopt the ABCS learning media as an innovative alternative instructional tool to support the teaching of physical fitness activities. For future research, it is suggested that the eligibility of this tool be examined at different educational levels (such as elementary and senior high schools) with a broader population scope. In addition, variations in obstacle design may be incorporated to further develop more complex physical fitness components.

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