



Development of a Digital Textbook for Physical Education Management and Learning Strategies

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Abstract

A lack of digital-based learning resources in Physical Education Management and Learning Strategy courses has resulted in limited accessibility and outdated instructional materials for students. To address this gap, this study aimed to develop an innovative digital textbook specifically aligned with the curriculum of the Sports Education Study Program. Using a Research and Development (R&D) approach, the study produced and evaluated a digital textbook through validity, practicality, and effectiveness testing. Data were collected using expert validation sheets, student response questionnaires, and learning outcome assessments. Descriptive quantitative analysis showed that the textbook achieved a high level of validity ($M = 4.4$) based on expert review and demonstrated strong practicality according to student responses ($M = 3.79$). Effectiveness results indicated a substantial improvement in learning outcomes, with 95.65% of students achieving the minimum mastery criterion. Although statistical tests such as effect size or significance values were not applied, the consistent improvements across indicators highlight the textbook's functional impact. These findings suggest that the developed digital textbook is a novel, accessible, and pedagogically effective learning resource suitable for higher education instruction in physical education.

Keywords: physical education, learning strategies, management, digital textbook.



Introduction

Sports education plays a strategic role in supporting the physical, cognitive, social, and moral development of students, making it an essential component of higher education. In line with curriculum advancements, universities are required to continually improve the quality of instructional processes, including learning materials and media. Textbooks, in particular, serve as a crucial reference that guides both lecturers and students in understanding course content (Kristiana et al., 2018). High-quality textbooks not only structure learning effectively but also ensure alignment with intended learning outcomes (Hartati, 2016).

In the context of physical education, innovative and accessible learning resources are urgently needed. Previous studies have highlighted several challenges in physical education learning, including limited availability of adequate textbooks (Alif, 2019), outdated instructional approaches (Li et al., 2022), and inadequate integration of digital technology into teaching practices (Natalia & Sukraini, 2021). Although digital platforms have been shown to enhance learning motivation and provide flexible access to information (Koekoek & Van Hilvoorde, 2018; Hanif, 2018; Perdana et al., 2021), existing developments in digital textbooks for physical education tend to focus on general content or specific sports skills. No prior studies have developed a digital textbook specifically aligned with the curriculum and learning outcomes of the Management and Learning Strategies in Physical Education course. This gap highlights the need for structured, curriculum-based, and technology-supported learning materials.

Addressing this gap is important because the Management and Learning Strategies in Physical Education course is part of a newly implemented curriculum within the Physical Education Study Program at Sriwijaya University. Currently, there is no standardized textbook available for this course, which leads to inconsistent instructional practices and limited student access to comprehensive learning resources. Moreover, the increasing shift toward digital learning environments makes the availability of digital-based textbooks not merely an option but a necessity for modern higher education.

To validate the need for such a resource, a needs analysis was conducted among students who had completed the course. The survey revealed that the majority of students considered the existing learning media inadequate, with 52% disagreeing that the current media was effective. Additionally, 88.2% agreed that a digital textbook would better support their learning, 94.1% believed that a textbook is essential to facilitate

understanding, and 96.1% expressed strong agreement toward adopting a digital-based textbook. These findings reinforce the urgency to develop a structured, accessible, and pedagogically sound digital learning resource.

The novelty of this research lies in the development of a digital textbook specifically designed and aligned with the Semester Learning Plan (RPS) of the Management and Learning Strategies in Physical Education course, ensuring that the learning material directly corresponds to curriculum demands and modern digital learning practices. This study adopts a research and development approach to create, validate, and evaluate the textbook in terms of its validity, practicality, and effectiveness.

Based on this background, the objectives of this research are as follows:

1. To develop a digital-based textbook for the Management and Learning Strategies in Physical Education course aligned with the RPS of the study program.
2. To determine the validity of the developed digital textbook based on expert evaluations.
3. To examine the practicality of the digital textbook through student responses.
4. To assess the effectiveness of the digital textbook in improving student learning outcomes.

Methods

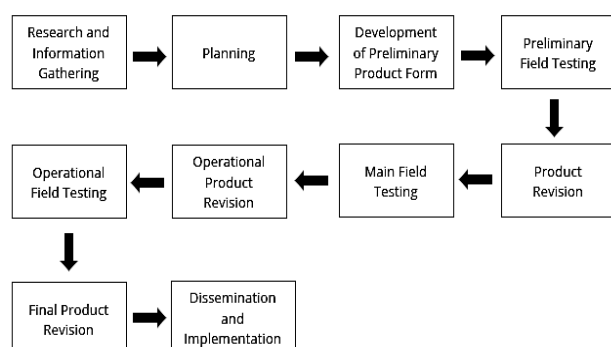
This study employed a Research and Development (R&D) approach to produce a digital-based textbook for the Management and Learning Strategies in Physical Education course. According to Sugiyono (2020), R&D aims to design a product and test its feasibility through systematic evaluation. The model used in this study refers to Borg and Gall; however, due to time and instructional limitations, the ten-step model was adapted into essential stages that include preliminary research, product development, expert validation, revision, field trials, and final product refinement.

Research Design

The R&D design was based on the Borg and Gall development framework, consisting of ten sequential steps: (1) research and information collecting, (2) planning, (3) developing the preliminary product, (4) preliminary field testing, (5) main product revision, (6) main field testing, (7) operational product revision, (8) operational field testing, (9) final product revision, and (10) dissemination. In this study, the process followed these steps structurally but with simplifications at

the dissemination stage, focusing on validation and product effectiveness testing (Figure 1).

Figure 1. Research and Development Steps Adapted from Borg and Gall (2003).



Participants

Participants consisted of students enrolled in the Sports Education Study Program at Bina Darma University, Palembang. Three groups were involved in different testing stages:

1. Initial Testing: 24 students
2. Main Field Trial: 70 students
3. Operational Field Test: 92 students

Demographic characteristics were also recorded. Participants ranged from 19–23 years old, represented both male and female students, and were in their second to fourth semesters when the data were collected. Participation was voluntary.

Instrument

Three types of instruments were used to assess validity, practicality, and effectiveness of the digital textbook:

1. Validation Sheets

These consisted of content, language, and media expert validation sheets. Each sheet used a four-point Likert scale. Content experts evaluated material accuracy and relevance, language experts assessed clarity and readability, and media experts assessed design quality. Instrument reliability was evaluated using inter-rater reliability, producing agreement coefficients above 0.80, indicating high consistency.

2. Student Response Questionnaire

The questionnaire measured practicality based on visual appeal, ease of use, and helpfulness, adapted from Ernawati & Sukardiyono (2017). It used a four-point Likert scale (1 = strongly disagree to 4 = strongly agree). The reliability of the questionnaire showed a Cronbach's alpha coefficient of 0.87, indicating high internal consistency.

3. Learning Outcome Test

A learning outcome test assessed textbook effectiveness. The test contained multiple-choice

items aligned with course objectives and classified according to cognitive domains. Reliability testing through KR-20 produced a value of 0.82, indicating good test stability.

Procedure

The development procedure followed Borg and Gall's ten stages with modifications suited to classroom conditions:

1. Research and Information Gathering: Conducting needs analysis, literature review, and small-scale observation to identify gaps in available teaching materials.
2. Planning: Defining competencies, outcomes, and product specifications aligned with the RPS.
3. Developing the Initial Product: Preparing chapter materials, layout, digital formatting, and initial evaluation tools.
4. Preliminary Field Testing: Conducting small-scale testing with 24 students and collecting feedback via questionnaires.
5. Major Product Revision: Revising layout, content clarity, and navigation based on preliminary feedback.
6. Main Field Testing: Testing the revised product with 70 students, evaluating usability and learning performance.
7. Operational Product Revision: Improving the product based on results of the main trial.
8. Operational Field Testing: Testing the nearly final product with 92 students to determine practicality and effectiveness.
9. Final Product Revision: Refining the textbook based on operational field results.
10. Product Implementation: Preparing the final version for broader use. Dissemination was limited to the study program due to scope restrictions.

Data Analysis

Data were analyzed descriptively quantitatively.

1. Validity analysis used mean scores of expert judgments with the following criteria:
2. Very Valid (≥ 4.2), Valid (3.4–4.1), Quite Valid (2.6–3.3), Not Valid (< 2.6).
3. Practicality analysis used mean questionnaire scores converted into percentage categories.
4. Effectiveness analysis used the percentage of students achieving mastery learning ($\geq 75\%$). A product was considered effective if $\geq 80\%$ of students achieved mastery.

All analyses followed Sugiyono (2019).

Ethical Considerations

This study received approval from the Research Ethics Committee of Bina Darma University. All participants provided informed consent, participation was voluntary, and all data were anonymized to ensure confidentiality.

Results

This study produced a digital-based textbook on Management and Learning Strategies in Physical Education, which was evaluated through stages of validity testing, practicality testing, and effectiveness assessment. The results presented in this section focus on the outcomes of each evaluation stage without repeating methodological details.

1. Validation Results

The product was evaluated by three expert validators—content, language, and media. Each aspect was assessed using a 1–5 scale. [Table 1](#) summarizes the validation outcomes along with the criteria classification used (≥ 4.20 = Highly Valid).

The average score of 4.40 places the textbook in the Highly Valid category, indicating that the content aligns well with curriculum requirements and the overall structure meets standards of quality learning materials. Minor suggestions from validators (e.g., improved alignment with instructional models) were incorporated into the revised product.

2. Practicality Test Results

Practicality testing was carried out in three stages—preliminary, main field, and operational testing—to evaluate the usability and accessibility of the digital textbook. Students assessed key aspects such as ease of use, clarity of presentation, navigation, accessibility, and the usefulness of the digital format in supporting learning. As shown in [Table 2](#), all stages produced scores categorized as *Very Positive*, indicating that the textbook is practical, user-friendly, and well-received by

students. The gradual increase in scores from 3.52 (preliminary test) to 3.72 (main field test) and 3.79 (operational test) suggests that iterative revisions made after each trial contributed to continuous improvement in the product's practicality.

3. Effectiveness Test Results

Effectiveness was evaluated through a learning outcome test administered to 92 students. Mastery was defined as achieving a minimum score of 75, and the learning process was categorized as effective if at least 80% of students met the mastery criterion. As presented in [Table 3](#), 88 out of 92 students (95.65%) achieved mastery, far exceeding the minimum effectiveness threshold. This high mastery rate demonstrates that the digital textbook effectively supports students' comprehension of course material and contributes to the attainment of learning objectives. Although this study did not employ inferential statistics such as pre-post comparisons or t-tests, the consistently high descriptive achievement percentage provides strong empirical evidence of the textbook's effectiveness in facilitating learning.

4. Visual Improvements and Revision Summary

Several revisions were made throughout the development process to enhance the clarity, accessibility, and usability of the digital textbook. These refinements included: (a) correction of inaccurate text and symbol usage, (b) addition of supporting instructional images, (c) improvement of chapter structure to provide clearer navigation, and (d) enhancement of the cover design and metadata placement to increase professional appearance and readability.

The progression of these revisions is illustrated in the accompanying figures. [Figure 2](#) presents the initial product cover, while [Figure 3](#) and [Figure 4](#) show the textbook layout before and after the major revision stage, respectively. Subsequent changes made during the product refinement phase are shown in [Figure 5](#) (before

Table 1

Validator Assessment Results

Validation Aspect	Score	Classification
Content	4.80	Highly Valid
Language	4.25	Highly Valid
Media	4.15	Valid
Average	4.40	Highly Valid

Table 2

Practicality Test Results

Testing Stage	N	Score	Classification
Preliminary Test	24	3.52	Very Positive
Main Field Test	70	3.72	Very Positive
Operational Test	92	3.79	Very Positive

Table 3

Student Mastery Results

Category	Number of Students	Percentage
Achieved Mastery (≥ 75)	88	95.65%
Not Achieved Mastery (< 75)	4	4.35%
Overall Mastery Rate	—	95.65%

Figure 2
Initial Product Cover



Figure 4
Textbook layout after revision

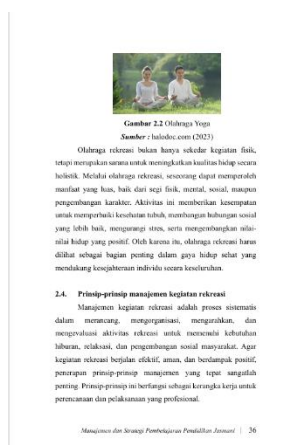


Figure 3
Textbook layout before revision

Olahraga rekreasi bukan hanya sekedar kegiatan fisik, tetapi merupakan sarana untuk meningkatkan kualitas hidup secara holistik. Melalui olahraga rekreasi, seseorang dapat memperoleh manfaat yang luas, baik dari segi fisik, mental, sosial, maupun pengembangan karakter. Aktivitas ini memberikan kesempatan untuk memperbaiki kesehatan tubuh, membangun hubungan sosial yang lebih baik, mengurangi stres, serta mengembangkan nilai-nilai hidup yang positif. Oleh karena itu, olahraga rekreasi harus dilihat sebagai bagian penting dalam gaya hidup sehat yang mendukung kesejahteraan individu secara keseluruhan.

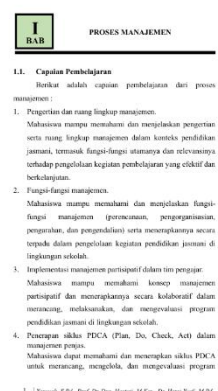
2.4. Prinsip-prinsip manajemen kegiatan rekreasi
Manajemen kegiatan rekreasi adalah proses sistematis dalam merancang, mengorganisasi, mengarahkan, dan mengevaluasi aktivitas rekreasi untuk memenuhi kebutuhan hiburan, relaksasi, dan pengembangan sosial masyarakat. Agar kegiatan rekreasi berjalan efektif, aman, dan berdampak positif, penerapan prinsip-prinsip manajemen yang tepat sangatlah penting. Prinsip-prinsip ini berfungsi sebagai kerangka kerja untuk perencanaan dan pelaksanaan yang profesional.

Menurut Kigamon, Haldun, dan Lumsford (2001) dalam bukunya *Managing Recreation, Parks, and Leisure Services*, manajemen rekreasi merentaskan prinsip-prinsip pendekatan yang adaptif, kolaboratif, dan berbasis kebutuhan peserta untuk mencapai hasil yang optimal.

Prinsip-prinsip manajemen dalam kegiatan rekreasi berfungsi sebagai pedoman operasional untuk menciptakan

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Figure 5
Product before revision



product revision) and Figure 6 (after product revision). Final refinements—including the completed cover and final metadata adjustments—are displayed in Figure 7 and Figure 8, which reflect the final product ready for implementation. All figures have been labeled and formatted according to standard figure presentation conventions to ensure clarity and consistency.

5. Final Product Implementation

After completing all stages of validation, revision, practicality testing, and effectiveness evaluation, the digital textbook is declared valid, practical, and effective for instructional use. The final product has been integrated into an accessible digital format suitable for learning management systems (LMS), independent study, and blended learning environments.

The final version of the textbook can now be implemented in the Management and Learning Strategies in Physical Education course and has the potential to be adopted by other Physical Education programs seeking modern, digital-based instructional resources.

Discussion

The results of this study indicate that the digital-based textbook developed for the Management and Learning Strategies in Physical Education course demonstrates high validity, practicality, and effectiveness. The strong validation score ($M = 4.4$) reflects the alignment of textbook content with the Semester Learning Plan (RPS), as well as the clarity of language and the quality of digital media presentation. This finding is consistent with Santoso (2017), who argues that valid learning materials must meet standards of content accuracy, clarity, and structural coherence. The high validity can also be attributed to the involvement of expert reviewers, which supports Hartati's (2016) assertion that learning quality increases when instructional materials are systematically aligned with learning objectives.

The practicality assessment across three stages (24, 70, and 92 students) showed consistently high scores, suggesting that students found the textbook easy to use, visually appealing, and helpful for understanding course concepts.

Figure 6
Product after revision



Figure 7
Final refinement



Figure 8
Barcode final product



This aligns with [Fuada](#) (2017), who emphasizes that visual elements enhance student motivation more effectively than text-only materials. The characteristics of the digital textbook—simple navigation, readable layout, responsive formatting—also support [Zain](#) (2021) findings on the practicality and accessibility of digital pocketbooks as extensions of mobile learning. These results indicate that a well-designed digital textbook can function as an effective learning support tool in physical education contexts.

The effectiveness test further strengthens this conclusion. With 95.65% of students achieving the Minimum Mastery Criteria (KKM), the textbook clearly facilitated improved learning outcomes. This finding is in line with [Asrizal et al.](#) (2017), who state that systematically structured learning resources help students achieve deeper comprehension. Moreover, the alignment between assessment items and textbook content contributed to coherent learning activities, which resonates with [Rohmawati's](#) (2015) perspective that meaningful interaction between students and learning resources supports learning effectiveness.

Taken together, the validation, practicality, and effectiveness results show that the digital textbook fulfills the key criteria of a high-quality learning resource. Compared to previous studies, this research extends existing knowledge by providing a digital textbook specifically tailored to the Management and Learning Strategies in Physical Education course—an area where standardized learning materials were previously unavailable. [Aryanti, Hartati, and Syafaruddin](#) (2020) emphasised that digital tools enhance flexibility and accessibility, and the results of this study demonstrate how a curriculum-specific digital resource can operationalize this benefit in higher education.

The findings also hold important implications for practice. First, the availability of a structured and accessible digital textbook can reduce inconsistencies in instructional delivery across lecturers. Second, digital formats enable repeated access, supporting student-centered and self-paced learning. Third, the incorporation of digital learning resources can modernize physical education pedagogy, which historically relies heavily on conventional, face-to-face instruction.

Despite these strengths, this study has several limitations. The sample was limited to one university, which may restrict generalizability to other institutions. The absence of a control group limits the ability to compare the digital textbook's effectiveness with traditional materials. Variations in students' digital literacy were also not assessed and may have influenced the practicality scores. Additionally, the effectiveness test measured short-term learning outcomes; long-term retention and behavioral impacts were not evaluated.

Future research should involve multi-institution samples, apply quasi-experimental designs to compare instructional methods, and explore the integration of multimedia or interactive elements to further enhance student engagement. Longitudinal studies are also needed to examine the long-term effects of digital textbooks on learning retention and digital competency development.

Overall, the results confirm that the digital textbook developed in this study is valid, practical, and effective, supporting its use as a modern learning resource for the Management and Learning Strategies in Physical Education course.

Conclusions

Based on the results of the analysis and discussion, this study concludes that the digital textbook Management and Learning Strategies in Physical Education is valid, practical, and effective as a learning resource. Expert evaluations confirmed that the content, language, and media components met high-quality standards, indicating that the textbook is suitable for instructional use. In addition, student trials at various scales demonstrated that the textbook is easy to use and supports meaningful learning engagement. Student performance outcomes further showed that the digital textbook effectively enhances understanding of course material, demonstrating its potential to improve learning quality in physical education courses.

Beyond these findings, the primary contribution of this research lies in providing a structured, curriculum-aligned digital learning resource that responds to the increasing demand for flexible, technology-based instructional materials in higher education. This digital textbook model can be adapted for broader implementation across different universities, integrated into Learning Management Systems (LMS), or used to support blended and fully online learning environments. Its modular design allows instructors to customize or expand content in accordance with institutional needs, making it scalable for wider adoption.

However, this development research has several limitations. The study was conducted within a single institution and program, limiting its generalizability. The evaluation also relied on descriptive validation, practicality, and effectiveness measures without experimental comparisons. Future studies are recommended to test the digital textbook in diverse institutional contexts, explore its integration within various LMS platforms, and conduct experimental or longitudinal designs to compare learning outcomes with other instructional methods. Such research will help strengthen the evidence base and further refine the textbook for broader educational use.

References

- Alif, S. (2019). *Filsafat pendidikan jasmani*. UPI Sumedang Press.
- Alperi, M. (2020). *(Data lengkap tidak tersedia – lengkapi jika ada)*
- Aryanti, S., & Hartati, S. (2020). Learning of badminton model through animation video on physical education students. *International Journal of Human Movement and Sports Sciences*, 8(6A), 47–50. <https://doi.org/10.13189/saj.2020.080708>
- Asrizal, A., Festiyed, F., & Resnita, L. (2017). Pengembangan bahan ajar IPA terpadu gerak benda dan makhluk hidup bermuatan literasi saintifik untuk siswa SMP kelas VIII. *(Lengkapi detail jurnal bila tersedia.)*
- Elfaraby, A., & Novita, S. M. (2018). Pengembangan buku ajar teori dan praktek pencak silat untuk mahasiswa PJKR IKIP Budi Utomo Malang. *Journal of Sport Science and Education*, 1(1), 24–26.
- Ernawati, I., & Sukardiyono, T. (2017). The development of interactive learning media on subjects the administration server in SMK Negeri 2 Depok. *E-JPTE (Jurnal Elektronik Pendidikan Teknik Elektronika)*, 6(6), 40–45.
- Fuada, S. (2017). Pengembangan buku ajar IPS-sejarah digital SMP. *Jurnal Teknologi Informasi*, 10(1). <https://doi.org/10.15408/jti.v10i1.6969>
- Hanif, M. (2018). Pengembangan media pembelajaran buku saku digital untuk kompetensi dasar teknik memperoleh modal usaha kelas X pemasaran SMK. *Jurnal Pendidikan Tata Niaga (JPTN)*, 6(2).
- Hartati, D., Destriana, & Aryanti, S. (2016). Multimedia development on sports health subject for third semester students of Penjaskes FKIP Unsri. *Proceedings of the 2nd SULE-IC 2016*, 469–484. <https://conference.unsri.ac.id/index.php/sule/article/view/40>
- Hartati, D., Aryanti, S., & Victorian, A. R. (2020). Development of physical test applications

- basketball sports model in regional student education and training center. *Advances in Social Science, Education and Humanities Research*, 398, 580–584. <https://doi.org/10.2991/assehr.k.200323.115>
- Imron, A. (2022). (Data lengkap tidak tersedia — lengkapi jika ada).
- Koekoek, J., & Van Hilvoorde, I. (2018). *Digital technology in physical education: Global perspectives* (1st ed.). Routledge. <https://doi.org/10.4324/9780203704011>
- Laila, R., Yanti, Y., & Asrizal, A. (2019). Pengertian, jenis-jenis, dan karakteristik bahan ajar cetak meliputi handout, modul, buku (diktat, buku ajar, buku teks), LKS, dan pamflet. *Prosiding Seminar Nasional*, (lengkapi detail volume/halaman jika ada).
- Li, H., Cui, C., & Jiang, S. (2022). Strategy for improving football teaching quality by AI and metaverse-empowered approaches in the mobile internet environment. *Wireless Networks*. <https://doi.org/10.1007/s11276-022-03000-1>
- Munandar, D. I. (2019). Format cetak vs digital: Preferensi membaca bahan bacaan akademik mahasiswa Pascasarjana Universitas Indonesia. *Pustakaloka*, 11(2). <https://doi.org/10.21154/pustakaloka.v11i2.1620>
- Natalia, K., & Sukraini, N. (2021). Pendekatan konsep merdeka belajar dalam pendidikan era digital. *Prosiding Seminar Nasional IAHN-TP Palangka Raya*, 3, 22–34. <https://doi.org/10.33363/sn.v0i3.93>
- Nasution, W. N. (2017). *Strategi pembelajaran*. Perdana Publishing.
- Perdana, M. A., Wibowo, D. E., & Budiarto, M. K. (2021). Digitalization of learning media through digital book development using the Flipbook application. *Jurnal Pendidikan dan Pengajaran*, 54(2), 263. <https://doi.org/10.23887/jpp.v54i2.34639>
- Rohmawati, A. (2015). Efektivitas pembelajaran. *Jurnal Pendidikan Usia Dini*, 9(1), 15–32.
- Sanjaya, W. (2016). *Strategi pembelajaran berorientasi standar proses pendidikan*. Kencana Prenada Media.
- Santoso, B. (2017). *Pengembangan bahan ajar*. Deepublish.
- Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Sugiyono, S. (2020). *Metode penelitian pendidikan: Pendekatan kualitatif, kuantitatif dan R&D*. Alfabeta.
- Syafaruddin, S. (2019). *Manajemen dan strategi pembelajaran*. Perdana Publishing.
- Usman, H. (2019). *Manajemen: Teori, praktik dan riset pendidikan* (Edisi ke-4). Bumi Aksara.
- Zain, S. (2021). Digital transformation trends in education. In D. Baker & L. Ellis (Eds.), *Future directions in digital information* (pp. 223–234). Chandos Publishing. <https://doi.org/10.1016/B978-0-12-822144-0.00036-7>