Need analysis of disseminate handbook based on guided inquiry in animal physiology subject

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Abstract. The development of Guided Inquiry-based animal physiology guides has been developed with very valid, practical and effective results. For the handbook to be used by all universities, it is necessary to stage disseminate guided inquiry-based animal physiology handbooks. This is because the handbook of animal physiology developed can form concepts and theories and also breaks down, assembles, compares and modifies the physiological processes of the body through practice activities. The purpose of this study is to guide and guide guided inquiry-based physiology. This research is development research, using a 4D model. This stage of research is disseminated. Data was obtained using questionnaires given to lecturers, students, assistants involved in lectures on animal physiology. Data is processed with descriptive analysis. The results showed that disseminate analysis was needed for the development of a guided inquiry-based physiology handbook with a value of 79.27 %. It is necessary to conclude that the needs analysis of disseminate inquiry into physiology-based animal physiology is need. So the disseminate stage of handbook developed in similar study programs in other tertiary institutions needs to be done.

1. Introduction

Animal physiology discusses the basic principles of animal physiology, metabolism and energy, permeability and transportation of substances across the plasma membrane, ions and stimulation of membranes, muscles and motion, blood and body fluids, circulation, nutrition and food digestion, respiration, excretion, osmoregulation, nerve coordination, hormone coordination, thermoregulation, sensory receptors and effectors. During the lecture process, animal physiology courses are assisted by practical activities. Practic activities require a handbook as one of the teaching materials. A handbook can be used as a guideline in carrying out practical activities so that the objectives and implementation of the practice can be seen through the results of the practice obtained [1]. The handbook is a guideline for practice which contains procedures for preparation, implementation, analysis of data and reporting prepared by a person or group of teaching staff who handle practicums and follow the rules of scientific writing [2]. The format of the handbook is the practice title, practice objective, description of the material, tools and materials, work steps, observations and conclusions [3].

The handbook has been developed with guided inquiry-based. Guided inquiry is learning that can improve the effectiveness of student science processes through learning done [4]. Guided inquiry is an active learning model. Inquiry involves the process of asking questions and finding out answers to
scientific questions made by students [5]. Also besides, inquiry activities include various activities such as asking questions, making observations, submitting opinions, studying books and other information to see what has been known from proven findings [6]. Thus the guide to using guided inquiry can train students’ independence in finding their knowledge. A guided inquiry has several advantages, including arousing student curiosity as part of intrinsic motivation [7]. It is different with other research that suggest guided inquiry is effective to encourage student involvement and motivation and helps students gain an in-depth understanding of learning [8].

The handbook has been developed with a guided inquiry approach in animal physiology courses. The results of the development in terms of validity are very valid, practical, namely practical from lecturers and students [9] and the results of effectiveness are ineffective categories both in terms of motivation, activities and learning outcomes [10]. For the practicum guide to be utilized by all tertiary institutions from the same study program, it is necessary to stage disseminate guided inquiry-based animal physiology practice guides. This is done because the guise of animal physiology developed can form an understanding of concepts and theories and also break down, assemble, compare and modify the physiological processes of the body through practical activities. Disseminate activities will see guiding effectiveness in other universities.

Research on disseminating which has seen the effectiveness of learning has been done, including research with the title The Effectiveness of Guided Inquiry Learning for Comparison Topics, with the results of the learning tools produced can be used as alternative learning tools for teachers [11]. Besides, the study was titled The Effectiveness of Guided Inquiry-Based Learning Materials on Students 'Literacy Skills, with the results of guided inquiry-based learning material being effective to improve students' science literacy skills on solubility and solution product concepts in senior high school [12]. The purpose of this study was to determine the need to disseminate guided inquiry-based animal physiology practicum guides.

2. Methods
This research is development research, using a 4D model. The stages of this research are disseminated. Data was obtained using questionnaires given to lecturers totaling 4 people, assistants with a total of 5 people and students involved in 28 physiology lectures. Modified questionnaires from Sophia [13] with indicators seen are the availability of handbook, components of the handbook, implementation of learning with the handbook, guided inquiry, material and contents of handbook, the desire to disseminate the handbook. Questionnaires use choices from the Likert scale. Data is processed by the percentage formula proposed by Riduwan [14] as follows:

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\text{Value of percentage} = \frac{\text{score obtained}}{\text{maximum score}} \times 100\%
\]

The level of needs analysis uses the Riduwan and Akdon classification [15] as in Table 1.

| Percentage (%) | Criteria     |
|----------------|--------------|
| 81 – 100       | Very Need    |
| 61 – 80        | Need         |
| 41 – 60        | Need Enough  |
| 21 – 40        | Not Need     |
| 1 – 20         | Very Not Need|

3. Results and Discussion
From the results of data analysis, it was found that the results of need analysis disseminate the development of guided inquiry-based practicum guides filled with lecturers, assistants and students showed that disseminate the development of this practicum guide was needed with a percentage of 79.27%. The details of the results of indicators from processed data can be seen in Figure 1.
Figure 1. Analysis of data needs to disseminate the development of a guided inquiry-based handbook

From Figure 1, it can be seen that the results of the assessment of lecturers, assistants, and students showed disseminate the development of a guided inquiry-based handbook that is needed. The average score of the lecturers' assessment is 87.59% with the criterion needed, assistants namely 76.81% with the criteria needed and from students that is 73.41% with criteria needed. This means that lecturers, assistants, and students want and are in dire need that guided inquiry-based physiology handbook be developed to other universities.

In the aspect of the availability of guided inquiry-based animal physiology guides, in the place to be disseminated it was found that the availability level was low, which included 50% of lecturers, 20% of teaching assistants and 21.4% students (Figure 1). It appears that guided inquiry-based animal physiology is not yet available. Practicum guides available so far have not used the approach or learning model that can improve student understanding and student skills in finding their knowledge. Based on the facts found, it is necessary to spread the practicum guide using the guided inquiry approach, because the use of the guided inquiry approach in the practicum guide can help students find their abstract knowledge, especially related to animal physiology material. The guided inquiry learning model provides opportunities for students to learn how to find facts, concepts, and principles through their direct experience. Thus, students will not only learn by reading and memorizing subjects, but also get the opportunity to practice developing scientific thinking skills, and it is possible to have a knowledge construction process well, so students will be able to improve their abilities and understanding of the material being studied [16],[17]

Mastery of concepts and the formation of student attitudes better with the application of guided inquiry instruction incorporating a cooperative learning approach. The learning process with guided inquiry instruction in small groups has helped students learn meaningfully by discussing and connecting concepts, so students are helped, facilitated and motivated to recognize and share ideas, understand concepts, restructure their conceptual and attitudes.

Respondents' assessment of the aspects of the practical guiding component ranged from 83.93 to 97.5% (Figure 1). This shows that it is necessary to disseminate the guided inquiry-based practicum as an effort to improve the practicum guiding component that already exists. Practicum guides that have been developed already meet the guiding components of a good and structured practicum. The guiding component of the practicum contains titles, practicum objectives, theoretical basis, tools and materials,
work procedures, observation datasheets, questions for analysis, data, conclusions, and bibliography [18]. The advantages of practicum guides are that students can learn and progress at their own pace, can repeat material in printed media, students will follow logical order logically, the combination of text and images in print media is commonplace, and this can add attraction and can facilitate the understanding of information presented in two formats, verbal and visual and the contents of the media format must be updated and revised in accordance with the development and new findings in the field of science [19].

In the aspect of implementing learning by using guided inquiry-based practicum guides, the assessment of lecturers, assistants, and students ranges from 73.33-100%. This shows that the guide developed can create a conducive atmosphere (fun) and students also participate/play an active role in practicum. The guided inquiry learning model provides opportunities for students to learn how to find facts, concepts, and principles through their direct experience. The application of student guided inquiry learning models more active and motivated to do activities experimental, so students are more cognitive high increase and produce better grades [20]. Besides, the implementation of guided inquiry in learning, students and teachers work together to formulate problems and develop answers and students actively find concepts and materials through the process of inquiry [21]. This is supported because the practicum guides are presented various problems related to the material to be practiced as well as the columns that can later be filled in / written down in the results of the discussion and the results of the practicum they have completed. Besides, the use of practicum guides is guided by sentences that enable students to work independently if used outside the laboratory room. Also, the implementation of learning using guided inquiry-based practicum guides have been developed systematically and structured. Students have started their activities according to the stages in the practical guide and components contained in the practical guide. Practical guiding stages also contain guided inquiry aspects. So at the beginning of the practical activity, students begin by identifying and determining the scope of the problem, planning and predicting the results of investigations for data collection, interpretation of data and developing conclusions and reflection. At the stage of planning and predicting results, students carry out the process of extracting material with practicum activities.

The guided inquiry aspect contained in the practical guide can greatly help lecturers, assistants, and students in practice activities. Because guided inquiry learning is learning that is well used for students and teachers who are not accustomed to using the inquiry model in learning activities [22]. In the learning process with the guided inquiry approach, the teacher acts as a mentor in the formulation of conclusions [23,24]. Guided inquiry is more effective than conventional learning in improving both the science-knowledge content and the skills process of students [25].

The material contained in teaching materials is by following the curriculum. The material contained in the guide is the material and content of teaching materials used by lecturers in face to face in class. The material contained in the practical guide is a description of abstract face-to-face meetings. Among these materials are erythrocyte structure and hemolysis, blood analysis, blood coagulation speed and blood type testing, hemin crystal formation and fibrin viewing, measuring blood pressure, the effect of activity on the pulse, seeing blood flow, animal respiration rate, osmoregulation, thermoregulation, contraction muscle, feed efficiency, and urine test.

In the aspect of the desire to disseminate the practical guide, the value is very necessary. This shows that the practical guide is necessary and feasible to be developed in other universities. This is supported because the components, content and structure, the guide to this practice can and is worth trying on other colleges. In addition, this handbook uses a guided inquiry model and the application of guided inquiry learning models on practical guides can increase students' enthusiasm in activities [26]. Animal physiology practicum guides that will be asked are also able to make creative students because guided inquiry learning is effective for improving mastery of concepts, student performance and collaboration [27]. Also, guided inquiry can improve students' understanding in explaining the concept of knowledge [28]. All of these things illustrate that indeed it is needed to do disseminate handbook on animal physiology to similar study programs at other universities.
4. Conclusion
It is necessary to conclude that the needs analysis of disseminating inquiry into physiology-based animal physiology is needed. The availability of inquiry-based handbook was needed by lecture, assistant and students as well since this type of handbook encourage more students to develop thinking skills that probably affect their understanding in explaining the concepts.

5. References
[1] Mastura M, Mauliza M and Nurhafidah N 2017 Desain Penuntun Praktikum Kimia Berbasis Bahan Alam Jurnal IPA dan Pembelajaran IPA (JIPI) 2 pp 203-212
[2] Nurussaniah N and Nurhayati N 2016 Pengembangan penuntun praktikum fisika dasar berbasis guided inquiry untuk meningkatkan kemampuan berpikir kritis mahasiswa Prosiding Seminar Nasional Fisika 563-68
[3] A. Rahayu H M and Kurniawan A D 2018 Pengembangan Penuntun Praktikum Fotosintesis Berbasis Audio Visual Menggunakan Program Camtasia Studio di SMAN 1 Hulu Gurung Jurnal Pendidikan Sains Indonesia 62 75-82
[4] Purwati R, Prayitno B A and Sari D P 2016 Penerapan model pembelajaran inkuiri terbimbing pada materi sistem ekskresi kulit untuk meningkat kanketerampilan proses sains siswa kelas XI SMA InProceeding Biology Education Conference: Biology, Science, Enviromental, and Learning 13 1 325-329
[5] Hartono R 2013 Ragam Model Mengajar yang Mudah Diterima Murid(Yogyakarta: DIVA Press)
[6] Latifani C, Rinanto Y and Marjono M 2016 Implementation Of Guided Inquiry Learning Model To Enhance Student Curiosity At Grade X MIPA 2 CLASS Of SMA NEGERI 6 Surakarta Academic Year 2015/2016 Bio-Pedagogi 521-6
[7] Pluck G and Johnson H L 2011 Stimulating Curiosity to Enhance Learning Education in Science and Psychology 2 19
[8] Eggen P and Kauchak D 2012 Strategi dan Model Pembelajaran (Jakarta: PT Indeks)
[9] Widiana R, Sumarmin R, Susanti D and Susanti S 2019 The practicality of practicum guidance based guided inquiry approach on animals physiology course The practicality of practicum guidance based guided inquiry approach on animals physiology course. Journal of Physics: Conference Series. J. Phys.: Conf. Ser. 1157 022077
[10] Widiana 2018 The Effectiveness and Implementation of Guiding Practical Based Guided Inquiry to Improving Learning Outcomes on Animal PhysiologyInternational Journal of Progressive Sciences and Technologies (IJPSAT) 10 1 126-133
[11] Asnidar K S and Sulaiman R 2018 The Effectiveness of Guided Inquiry Learning for Comparison Topics. IOP Conf. Series: Journal of Physics: Conf. Series 947 012033
[12] Aulia E V, Poedjiastoeti S and Agustini R 2018. The Effectiveness of Guided Inquiry-based Learning Material on Students' Science Literacy Skills. IOP Conf. Series: Journal of Physics: Conf. Series 947 1 012049
[13] Sophia A 2017 Pengembangan Penuntun Praktikum Tkasonomi Invertebrata Berbasis Pendekatan Saintifik untuk Mahasiswa Tesis Universitas Negeri Padang
[14] Riduwan M B A 2011 Belajar Mudah Penelitian(Bandung: Alfabeta)
[15] Riduwan A and Akdon A 2013 Rumus dan Data Dalam Analisis Statistika (Bandung: Alfabeta)
[16] Ibrahim A S and Wulan A R 2014 Penerapan Kelas Pembelajaran untuk Mendiagnosis Kesulitan BelajarSiswa SMA pada Materi Ekskresi Manusia Pendidikan Fomica Online 1
[17] Bilgin I 2009 The effects of guided inquiry instruction incorporating a cooperative learning approach on university students' achievement of acid and base concepts and attitude toward guided inquiry instruction Scientific Research and Essay 4 10 1038-1046
[18] Santayasa W 2007. Landasan Konseptual Media Pembelajaran. Makalah untuk Workshop Media Pembelajaranbagi Guru-Guru SMA Negeri Banjar Angkan UNDIKSHA
[19] Arsyad A 2013 Media Pembelajaran(Jakarta: Rajawali Press)
[20] Nasution S WR, Bukit N dan Ginting E M 2016 Pengaruh Model Pembelajaran inkuri Terbimbing dan Kreativitas terhadap kognitif Jurnal Pendidikan Fisika 52 101-105
[21] KubicekJ 2005Inquiry-based learning,thenature of science,and computer technology: New possibilitiesin science education Canadian Journal of Learning and Technology311 1-5
[22] Wardani S, Nurhayati S and Safitri A 2016 The Effectiveness of the Guided Inquiry Learning Module towards Students’ Character and Concept Understanding International Journal of Science and Research (IJSR)5 6 1589-1594
[23] Blanchard M R, Southerland S A, Osborne J W, Sampson V D, Annetta L A and Granger E M 2010 Is inquiry possible in light of accountability?: A quantitative comparison of the relative effectiveness of guided inquiry and verification laboratory instruction Science Education944 577-616
[24] Andriani N 2011 Efektifitas Penerapan Inkuiri Terbimbing (Guided Inkuiri) pada Mata Pelajaran Fisika Pokok Bahasan Cahaya di Kelas VIII SMP Negeri 2 Muara Padang Proceeding of Science and Learning Innovation National Symposium Bandung
[25] Mattehew B M and Kenneth I O 2013 A Study On The Effects Of Guided Inquiry Teaching Method On Students Achievement In Logic International Researcher21 135-140
[26] Obomanu B J, Nwanekzie A Uand Dorathy E 2014 Relative Effect of Two Forms of Pedagogy on Secondary School Students Performance in Ecology Concepts in Rivers State International Journal of Education andResearch210 237-250
[27] Wardani S, Kadarohman A, Buchari and Permanasari A2013 Java Culture Internalization in Elaktrometri in elektrometri Learning Based Inquiry Laboratory Aktivities to Increase Inter-Intrapersonal Intelligence International Journal of Science and Research25
[28] Almuntasheri S, Gillies R M and Wright T 2016 The Effectiveness of a Guided Inquiry-based, Teachers’ Professional Development Programme on Saudi Students’ Understanding of DensityScience Education International27 1 16-39