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Research Skill Development (RSD)-Integrated Online Report for Critical Thinking Skills

RESEARCH SKILL DEVELOPMENT (RSD)-INTEGRATED ONLINE REPORT FOR CRITICAL THINKING SKILLS

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Critical thinking of students

RSD Framework

- The six facets:
 - 1.Embark & Clarify,
 - 2. Find & Generate,
 - 3. Organise & Manage,
 - 4. Analyse & Synthesise,
 - 5. Communicate & Apply,
 - 6. Evaluate & Reflect
- The association with ICT

2, 5, 7, 8

11

RESEARCH QUESTIONS

- How do the students in a developing nation perceive the use of a Research Skill Development (RSD)-integrated online report in developing their critical thinking skills in a Plant Physiology Course?
- How do the tutors perceive the use of an RSD-integrated online report in developing students' critical thinking skills?



METHODOLOGY

- Indonesian context
- Participants: 39 second year undergraduate students studying Plant Physiology course and 2 tutors of the lab activity
- Initiating the RSD-integrated online report
- Methods
 - Students (attitudes)
 - Questionnaires : "-3" to "+3" Likert scale
 - Open field questions : Thematic coding
 - Tutors (performances and effectiveness)
 - Interview :Thematic coding



THE ONLINE REPORT AND THE RUBRIC

A. LANDASAN TEORI

Biji merupakan komponen vital dari diet dunia. Biji gandum sendiri, yang mana terdiri dari 90% semua biji yang dibudidayakan. Perkecambahan termasuk proses dimana dimulainya dengan proses imbibisi air oleh dorman, biasanya kering, biji dan berakhir dengan proses elongasi dari axis embrionik. Biji memiliki cadangan makanan yang membuatnya independen secara luas dari sumber daya lingkungan untuk bertahan hidup. Perubahan drastis tersebut dalam proses autotropik yang bergantung kepada suplai cahaya, CO2, air dan nutrisi anorganik dari sekelilingnya untuk pertumbuhan autotropik.

Perkecambahan adalah proses ketika bagian dari embrio, biasanya radikula, memasuki kulit biji dan mungkin berproses dengan air dan O2 dan pada temperatur yang stabil. Dormansi didefinisikan sebagai keadaan dari biji dimana tidak dan mengijinkan permintaan akan perkecambahan sering agak berbeda dari yang keadaan yang menguntungkan untuk tumbuh atau bertahan hidup dari tingkat kehidupan autotropik dari tanaman (Lambers, 2008).

inhibitor adalah zat yang menghambat pertumbuhan pada tanaman, sering didapat pada proses perkecambahan, pertumbuhan pucuk atau dalam dormansi. Di dalam tanaman inhibitor menyebar disetian organ tubuh tanaman tergantung dari jenis

Screen capture from the Plant Physiology online report (Wordpress)

		LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
		Students research	Students research	Students	Students
		at the level of a	at the level of a	research	engage in
		closed inquiry and	closed inquiry and	independen	open inquiry
		require a high	require a moderate	tly at the	within
		degree of	degree of	level of a	structured
		structure/guidance	structure/guidance	closed	guidelines
		-	-	inquiry	-
A.	Students	Aims/hypothesis	Aims/hypothesis	Aims/hypo	Aims/hypoth
	embark on	not made explicit	not clearly stated	thesis	sis clear,
	inquiry and so		or inappropriate	clear, but	focused and
	determine a			adheres	innovative
	need for			closely to	
	knowledge/und			guidelines	
	erstanding			-	
В.	Students	S urce of data	Data sampling	Data	Data from a
	find/generate	c d	protocols are	gathered is	variety of
	needed		adequate	appropriate	sources or
	information/dat			to	rigorous data
	ausing			aim/hypoth	collection
	appropriate			esis	
	methodology				
С.	Students	pee evaluation of	Limitations or	Limitations	Evaluation of
	critically	proj t completed	biases of the report	and biases	the whole
	evaluate		stated	ofthe	study design
	information/dat			report	is rigorous
	a and the			stated	
	process to				
	find/generate				
D.	Students	Data athered but	Data is	Report	Report writin
	organise.	not plesented in	incorporated into a	writing	conventions
	information	the r bort	report but no clear	convention	followed
	collected/gener		linkage between	s generally	completely
	ate		sections	followed	
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Е.	Students	Lin ited synthesis	Data compared or	L)ata	Syntnesis of
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				analunia in	comprehensi
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F	Students	Title is present	Title nortrava e	Titla	Titla
÷.	communicate	THIC IS PROCEED	general sense of	succinctly	succinctly
	knowledge d	Sources used, but	the report	portrava	portrava the
	and wronge in	o o di coo docu, but	and report	portuayo	poinayo me

RSD rubric used for marking the students' online report

RESULTS

Student Open-field Answers

1. What do you think critical thinking in Biology involves?

 Communicating and asking questions, doing a lab activity, applying the theory in a concrete situation (25/39)

2. Up to now, what has helped you to develop your critical thinking skills?

 Communicating and asking questions, doing a lab activity, applying the theory in a concrete situation (20/39)

3. Up to now, what has been a barrier to developing your critical thinking skills?

 Lack of facilities, technology, peer learning, determination to innovate and time management (17/39)

RESULTS

Likert-scale questions

25.64% agreement given by the students about the initiative use for developing their skills in organising and managing

• Open field questions

Organise & Manage (lack of facilities, technology, peer learning, determination to innovate and time management)

Likert-scale questions

>40% agreement given by the students about the initiative use for developing their skills in communicating and applying

• Open field questions

Communicate & Apply (communicating and asking questions, doing a lab activity, applying the theory in a concrete situation)

Possibility of impression to change

RESULTS

Interview with the two tutors

- The efficacy and efficiency of the online lab report
- The effectiveness of the RSD rubric
- Time management issues
- Training session for the implementation
- Guidebooks for the implementation





DISCUSSION

- The efficacy and efficiency of the online lab report
- Students' higher level of cognitive skill, motivation and self confidence
- The effectiveness of the RSD rubric
- Students' involvement in self-reflection, decision-making and knowledge-making practice 10, 2
- Time management issues
- The failure to address learning needs might lead to disappointing learning experience 6, I
- Training session for the implementation
- The need of clear articulation as a significant learning support
- Guidebooks for the implementation
- The need of clear articulation as a significant learning support

3, I

3, I



DISCUSSION

- Tutors
- Time management issues
- Guidebooks and trainings are required

Students

- Lack of facilities, technology, peer learning, determination to innovate and time management
- The non-existence of student perception about clear articulation to structure the initiative implementation



CONCLUSION

- The students and tutors actively approve of the use of the RSD-integrated online reports as having contributed to the students' critical thinking skills in spite of issues that emerged during the initiative implementation.
- Certain organisational and management issues (lack of facilities, technology, peer learning, determination to innovate and time management) occurred during the implementation that resulted in the lack quality of some online reports.

SIGNIFICANCE

- The RSD-integrated online report may encourage students to think more critically
- The RSD-integrated online report may promote the way teachers employ technology in a learning process



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