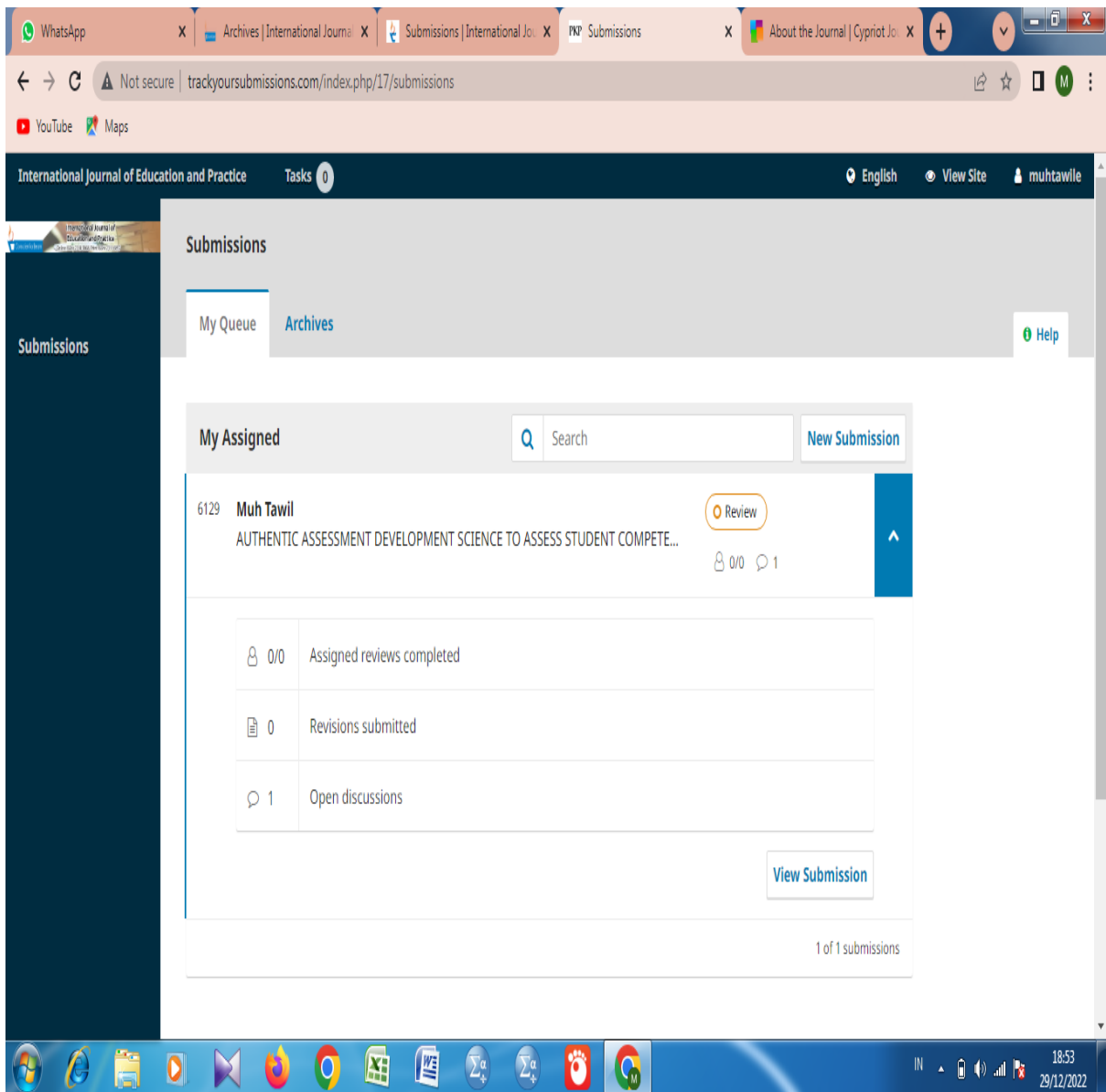


Dokumen coresponden Publikasi Artikel

TANGGAL SUBMIT: 20 Juli 2022



Dear Muh Tawil

Greetings!

Thank you for submitting the manuscript “Authentic Assessment Development Science to Assess Student Competency” To International Journal of Education and Practice we will inform you about the editorial decision. Please read our manuscript selection: <http://www.conscientiabeam.com/authors/manuscript-selection.html>. Thank you for considering our journal as a venue for your work.

Please write me, if you will have any question regarding your article.

Thanks and best regards,

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>

Social Media | YouTube



Muhammad Tawil <muhammادتawil32@gmail.com>

Editorial Decision: Article ID- IJEP/2115/22

17 messages

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: muhammادتawil32@gmail.com

Fri, Jul 29, 2022 at 4:50 PM

Dear Muh Tawil

Congratulations!

International Journal of Education and Practice
E-2310-3868/P-2311-6897
URL: <http://www.conscientiabeam.com/journal/61>

We are happy to let you know that your article "*Authentic Assessment Development Science to Assess Student Competency*" has been selected for **publication** in *International Journal of Education and Practice*. According to the journal's current policy, after acceptance, the author will need to pay (USD 1000 as an article processing fee+ USD 500 for proofreading and English editing fee). Your article was evaluated in a blind review process by two referees in addition to the input from the editor. Your article will available online within 90 to 120 working days after receiving the publication fee.

Comments:

The paper is conceptually ok but there is a required formatting/editing/proofreading/processing fee before publication. There is a USD 500 proofreading and English editing fee. Please pay the processing fee and send payment proof to proceed paper for publication.

Please pay the article processing fee by clicking on that link

URL: https://www.2checkout.com/checkout/purchase?sid=1987380&total=1500.00&cart_order_id=Publication%20Fee&c_prod=03&id_type=2&lang=en&mode=new&fixed=YPlease remember to quote the manuscript number, **IJEP/2115/22**, whenever inquiring about your manuscript.

If you require further information, please do not hesitate to write me.

I look forward to hearing from you soon.

Thanks and best regards,

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>**Social Media | YouTube***(Please always quote the article title and paper no. in any communication to us)*

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Sat, Jul 30, 2022 at 3:27 PM

Thank you for the information.

Dear editor of the
international journal
of education and
practice
ready to pay after it is
declared accepted
and will be
issued:IJEP/2115/22

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Sat, Jul 30, 2022 at 4:11 PM

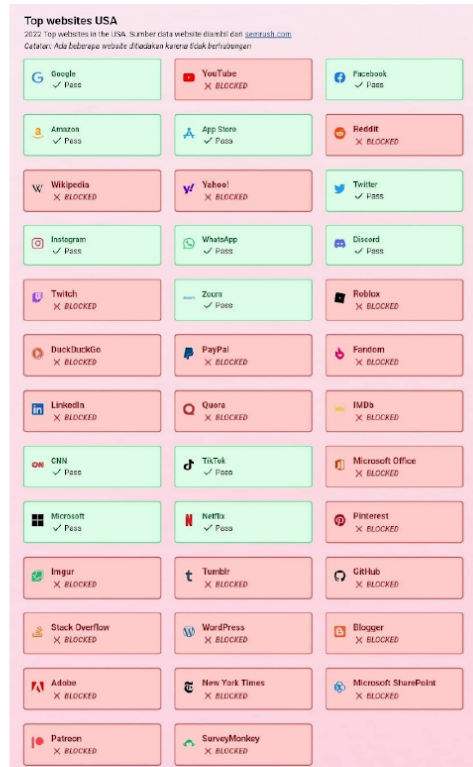
Dear editor of the
international journal
of education and
practice
The PayPal payment
system is blocked in
Indonesia, so paypal
payments cannot be
used. Immediately
provide information
on the payment
address for the article

publishing fee: IJEP/2115/22

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Sat, Jul 30, 2022 at 4:13 PM



[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Mon, Aug 1, 2022 at 5:32 AM

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Mon, Aug 1, 2022 at 5:41 AM

IJEP/2115/22

Dear editor of the international journal of education and practice

The Ministry of Information and Communications of Indonesia has blocked PayPal because it has not been registered, is there an alternative to the transfer of payment for the process of publishing articles, is the payment I transferred USD 1500?

On Mon, Aug 1, 2022 at 5:32 AM Muhammad Tawil <muhammادتawil32@gmail.com> wrote:

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Fri, Aug 5, 2022 at 7:56 PM

Dear **Sanele Philips**

Editorial Office

Conscientia Beam Research Publication

Regarding the cost of formatting/editing/proofreading/processing before the issuance of the manuscript number IJEP/2115/22, I'm having problems with the payment method, Please let me know another alternative payment method due to the issue of paypal being blocked in Indonesia.

I look forward to hearing from you soon.

Thanks and best regards,

Muh. Tawil

On Fri, Jul 29, 2022 at 4:51 PM Conscientia Beam Journals <articlestatus@conscientiabeam.com> wrote:
[Quoted text hidden]

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Mon, Sep 5, 2022 at 5:46 PM

Dear **Muh Tawil**

Thank you for your mail. Please find below the bank account details:

Option-1: UAE

Bank Name: RAKBANK

Beneficiary Account Name: CONSCIENTIA BEAM FZE LLC

Account No. 0032874583002

IBAN: AE070400000032874583002

Branch Name: DEIRA MAKTOUM, DUBAI

Swift Code: NRAKAEAK

Bank address: RAKBANK, P.O. BOX 1531, Dubai, UAE

Routing Code: 804020101

Currency: USD

Country: UAE

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>

Social Media | YouTube

(Please always quote the article title and paper no. in any communication to us)

4/1/23, 4:27 PM

Gmail - Editorial Decision: Article ID- IJEP/2115/22

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Thu, Sep 8, 2022 at 2:15 PM

Dear
Conscientia Beam Journals
Thank you for your mail.
I want to ask, at which address to send proof of payment for the article ID-IJEP/2115/22

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Thu, Sep 8, 2022 at 2:24 PM

thank you very much for information, I immediately made a payment transfer for the article ID-IJEP/2115/22
[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Thu, Sep 8, 2022 at 2:45 PM

Dear **Sanele Philips**
Editorial Office

Thank you very much for your reply email. In the last, please let me know, if I have completed the payment, where can I provide proof of payment for publication of manuscript number IJEP/2115/22? I apologize for asking too many questions, I'm just afraid the payment for publication is not known by the publisher.

I look forward to hearing from you soon.

Thanks and best regards,

Muh. Tawil

[Quoted text hidden]

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Thu, Sep 8, 2022 at 4:04 PM

Thank you for your email. Please send us payment proof by email attachment. Thanks

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>

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(Please always quote the article title and paper no. in any communication to us)

[Quoted text hidden]

4/1/23, 4:27 PM

Gmail - Editorial Decision: Article ID- IJEP/2115/22

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Wed, Sep 21, 2022 at 12:48 PM

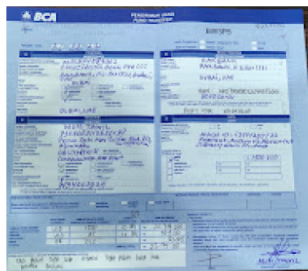
Dear **Sanele Phillip**
Editorial Office

Through this email I have attached proof of payment for publication fee's journal with the title "*Authentic Assessment Development Science to Assess Student Competency*" with manuscript number, **IJEP/2115/22**. I look forward to getting an email reply from you for the next step.

Thanks and best regards,

Muh. Tawil

[Quoted text hidden]



5cba08b3-1d50-41cf-82a1-b5d23fb2e9df.JPG
233K

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Thu, Sep 22, 2022 at 2:05 PM

Dear Muh Tawil

Thanks for your e-mail. I have received your payment proof. Now your paper is in production process. Within 10 to 15 days you will receive the final formatted copy for final proofreading.

If you require further information, please do not hesitate to write me.

With Best Regards,

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>

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(Please always quote the article title and paper no. in any communication to us)

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Wed, Oct 5, 2022 at 11:09 AM

That's great, thank you very much.

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>

Sun, Oct 16, 2022 at 12:48 AM

<https://mail.google.com/mail/u/0/?ik=430e44e459&view=pt&search=all&permthid=thread-f:1739680139970569803&simpl=msg-f:1739680139970...> 6/7

4/1/23, 4:27 PM

Gmail - Editorial Decision: Article ID- IJEP/2115/22

To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Dear Sanele Phillip
Editorial Office

Has the final proofreading been completed? Please let me know when the paper is published. thank you very much for your attention.

Best regards
Muh Tawil
[Quoted text hidden]

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Mon, Oct 17, 2022 at 12:12 PM

Dear Muh Tawil

Thanks for your email. It is under the process of English language proofreading. Thanks

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

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[Quoted text hidden]



Muhammad Tawil <muhammادتawil32@gmail.com>

Paper for proofreading: Authentic Assessment Development Science to Assess Student Competency

27 messages

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Fri, Sep 30, 2022 at 10:41 AM

Dear Muh Tawil

We are going to publish your paper in the forthcoming issue of "**International Journal of Education and Practice**"
Please improve your paper by changing the following:

1. Please check all the section numbers of the article.
2. Your paper abstract should not exceed 250 words
3. You should present from 6 to 10 keywords in the paper.
4. It is necessary to review the English (English must be improved).
5. Please provide the details of missing information in the references.
6. **Please send us the ORCID profile link of all authors. If you don't have ORCID profile, please open given link (www.orcid.org), create profile and send us link.**

Please send us a revised file within 48 hours by including the above comments. Otherwise, your paper will be in pending for publication.

Note: We also require e-mail id's and phone number of all authors and a **picture of only corresponding author**. It's compulsory for our new format to add the picture of corresponding author. We are waiting for your reply.

I look forward to hearing from you.

Sincerely,

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

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(Please always quote the article title and paper no. in any communication to us)


3 attachments**2115-IJEP-6129-ACC-QC Conscientia Beam AUTHOR QUERY FORM.docx**

20K

4/1/23, 3:59 PM

Gmail - Paper for proofreading: Authentic Assessment Development Science to Assess Student Competency

 **2115-IJEP-6129-ACC-QC 5%- Authentic Assessment Development Science.pdf**
4506K

 **2115-IJEP-6129-ACC-QC.doc**
6989K

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Fri, Sep 30, 2022 at 7:53 PM

Ok, I will do it.
Thanks you very much for information
[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>


Sat, Oct 1, 2022 at 7:19 PM

Dear Editor

sent the revised article IJEP 2115-22 : [AUTHENTIC ASSESSMENT DEVELOPMENT SCIENCE TO ASSESS STUDENT COMPETENCY](#)

Best Regards.

[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC Rev.docx**
520K

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>


Sat, Oct 1, 2022 at 8:03 PM

Dear Sanele Phillip

In fulfilling the publication requirements, I attach the revised results that I have completed with ID: IJEP/2115/22 :Authentic Assessment Development Science to Assess Student Competency according to the journal editor's instructions.

Thank you very much for your attention. I look forward to your reply for the next process.

Best regards
M. Tawil
[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC Rev.docx**
520K

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Tue, Oct 4, 2022 at 12:41 PM

Dear Muh Tawil

Thank you. I have received your revise file after proofreading. Now I am sending it for my final check.

If you will have other question, please write me

Thanks

4/1/23, 3:59 PM

Gmail - Paper for proofreading: Authentic Assessment Development Science to Assess Student Competency

Sanele Phillip

Editorial Office

Conscientia Beam

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[Quoted text hidden]

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Tue, Dec 6, 2022 at 12:42 PM

Hopefully, you are fine and working well. Please find in attachment your article. The academic editor requires a few clarifications from you before online publication. You will need to revise the paper or answer the queries. I am waiting for your reply.

Sanele Phillip

Editorial Office

Conscientia Beam


Research Publication

URL: <http://www.conscientiabeam.com>

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[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC again mail.docx**
451K

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Tue, Dec 6, 2022 at 6:11 PM

Dear Sanele Phillip

Thank you for your email. I will immediately complete your request.

Sincerely,
M. Tawil

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Tue, Dec 6, 2022 at 7:28 PM


Dear Sanele Phillip

via this email, I am attaching a revised paper ID : IJEP/2115/22 :Authentic Assessment Development Science to Assess Student Competence, to fulfillment the publication requirements

for your attention, thank you very much

Sincerely,
M. Tawil

[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC again mail rev.docx**
524K

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Wed, Dec 7, 2022 at 11:26 AM

Received, thank you.

[Sanele Phillip](#)

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[Quoted text hidden]

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Wed, Dec 7, 2022 at 12:21 PM

Thanks for your email. Please find the attached file and send us revised file after making some changes according to the comments. Thanks

[Sanele Phillip](#)

Editorial Office

Conscientia Beam


Research Publication

URL: <http://www.conscientiabeam.com>

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(Please always quote the article title and paper no. in any communication to us)

[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC again mail 7-12-2022.docx**
452K

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Thu, Dec 8, 2022 at 7:09 AM

Received, thank you

I immediately revised and sent via email

Author

Muh. Tawil

[Quoted text hidden]

4/1/23, 3:59 PM

Gmail - Paper for proofreading: Authentic Assessment Development Science to Assess Student Competency

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Thu, Dec 8, 2022 at 9:03 AM


Dear Conscientia Beam Journals

have completed all requirements and revisions related to the publication of the manuscript with ID: IJEP/2115/22 :Authentic Assessment Development Science to Assess Student Competenc "

Please let me know the publication schedule of this manuscript, Thank you very much for your attention

Sincerely,
M. Tawil

[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC again mail 7-12-2022 Rv.docx**
525K

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Thu, Dec 8, 2022 at 11:42 AM


Dear Sanele Philip

Here I attached the revised of the paper according to the comment.

Thank you very much for your support, let me know the schedule of Publication paper ID : IJEP/2115/22 : Authentic Assessment Development Science to Assess Student Competence.

Sincerely,
M. Tawil

[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC again mail 7-12-2022 Rv.docx**
525K

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Thu, Dec 8, 2022 at 11:44 AM

Thanks for your email.Please find the attached file and send us revised file after making some changes according to the comments.Thanks

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>


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(Please always quote the article title and paper no. in any communication to us)

[Quoted text hidden]

4/1/23, 3:59 PM

Gmail - Paper for proofreading: Authentic Assessment Development Science to Assess Student Competency

 **2115-IJEP.docx**
17K

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Thu, Dec 8, 2022 at 10:38 PM

Dear Conscientia Beam, Journals
Received, thank you.

Author ID : IJEP/2115/22 : Authentic Assessment Development Science to Assess Student Competence. received a suggestion from the editor December 6, 2022,

The journal accepts a 200 word abstract. Abstract is very short and less informative about intent and purpose. It provides very little background information, research instruments and methods of analysis.

then received another suggestion from the editor on December 8, 2022, the Journal received an abstract of 200 words.

Abstract rewritten under the following headings: Purpose, Design/Methodology/Approach, Findings, and Practical Implications

these two suggestions are inconsistent and the author has worked according to the suggestions of the editor.

Author

Muh. Tawil

[Quoted text hidden]

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Fri, Dec 9, 2022 at 1:43 PM

The journal accepts the abstract of 200 words. **The abstract rewrites in the following headings: Purpose, Design/Methodology/Approach, Findings, and Practical Implications.**

Sanele Phillip

Editorial Office

Conscientia Beam


Research Publication

URL: <http://www.conscientiabeam.com>

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[Quoted text hidden]

 **2115-IJEP-ABSTRACT.docx**
17K

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Sat, Dec 10, 2022 at 2:48 AM

Dear *Sanele Phillip*

Editorial Office

Conscientia Beam

Research Publication

via this email I am sending the revised abstract of 200 words. The abstract rewrites in the following headings: Purpose, Design/Methodology/Approach, Findings, and Practical Implications


Author ID : IJEP/2115/22 : Authentic Assessment Development Science to Assess Student Competence

4/1/23, 3:59 PM

Gmail - Paper for proofreading: Authentic Assessment Development Science to Assess Student Competency

Muh. Tawil

[Quoted text hidden]

 **2115-IJEP-ABSTRACT.docx**
15K

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Sat, Dec 10, 2022 at 10:53 AM

Received, thank you.

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>

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(Please always quote the article title and paper no. in any communication to us)

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Sat, Dec 10, 2022 at 12:33 PM

Noted with thanks.

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Tue, Dec 13, 2022 at 8:36 AM

Dear Conscientia Beam Journals


I have completed all requirements and revisions related to the publication of the manuscript with ID number IJEP/2007/22 ""Authentic Assessment Development Science to Assess Student Competency""

Please let me know the publication schedule of this manuscript, Thank you very much for your attention

Sincerely,

M. Tawil

[Quoted text hidden]

 **2115-IJEP-6129-ACC-QC again mail 7-12-2022 Rev.docx**
526K

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Tue, Dec 13, 2022 at 12:03 PM

4/1/23, 3:59 PM

Gmail - Paper for proofreading: Authentic Assessment Development Science to Assess Student Competency

On mon, Dec 19, 2022, I got the information: Thanks for your email. It is under process of English Language proofreading stage. Thanks

Now: On Wednesday, Dec 21, 2022, I got more information: It is under process of English Language proofreading stage

Why does the proofreading process take a long time?

When will the proofreading certificate be sent?

Author: manuscript with ID: IJEP/2115/22 : Authentic Assessment Development Science to Assess Student Competency

Muh. Tawil

[Quoted text hidden]

Conscientia Beam Journals <articlestatus@conscientiabeam.com>
To: Muhammad Tawil <muhammادتawil32@gmail.com>

Sat, Dec 24, 2022 at 2:53 PM

Thanks for your email. It depends on the availability of an academic editor. Thanks for understanding.

Sanele Phillip

Editorial Office

Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>

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(Please always quote the article title and paper no. in any communication to us)

[Quoted text hidden]

Muhammad Tawil <muhammادتawil32@gmail.com>
To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Sun, Dec 25, 2022 at 7:45 AM

Dear Conscientia Beam Journal

Thanks for your e-mail. When will the proofreading certificate be sent?

[Quoted text hidden]

[Quoted text hidden]

4/1/23, 4:05 PM

Gmail - Final Proofreading: Authentic Assessment Development Science to Assess Student Competency



Muhammad Tawil <muhammادتawil32@gmail.com>

Final Proofreading: Authentic Assessment Development Science to Assess Student Competency

26 messages

Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Tue, Jan 10, 2023 at 11:25 AM

To: Muhammad Tawil <muhammادتawil32@gmail.com>

Dear Muh Tawil

Thanks for your submission for publication with us. Now, your paper is at the final stage of academic editor proofreading and consistency checking. Please find in attachment the file of your article. You will find the comments within attached file and track changes of English Language proofreading. You will need to accept English Language track changes and further will need to answer the comments. We expect the comments changes in a different color to verify the changes easily.

You will need to prepare a response letter in which you will need to explain, how you have incorporated the changes.

I am waiting for the revised file.

Sanele Phillip

Editorial Office


Conscientia Beam

Research Publication

URL: <http://www.conscientiabeam.com>

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(Please always quote the article title and paper no. in any communication to us)

 **2115-IJEP-6129 ok and 1st QC - Comments.docx**
370K

Muhammad Tawil <muhammادتawil32@gmail.com>

Wed, Jan 11, 2023 at 11:05 AM

To: Conscientia Beam Journals <articlestatus@conscientiabeam.com>

Dear Editor IJEP

Thanks for your submission of my paper IJEP/2115/22, Authentic Assessment Development Science To Assess Student Competency files for final revision. I will immediately revise according to the editor's suggestions changes of English Language proofreading.

I am waiting for the publication.

Author

Muh. Tawil

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Wed, Jan 11, 2023 at 12:54 PM

4/1/23, 4:05 PM

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To: Muhammad Tawil <muhammادتawil32@gmail.com>

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Dear Editor IJEP

We have revised the results of the final review. Herewith we attach the results of revisions and response letter

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2 attachments



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Mon, Jan 16, 2023 at 12:41 PM

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Tue, Jan 17, 2023 at 11:03 AM

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Mon, Feb 6, 2023 at 11:33 AM

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The file that the IJEP editor sent is not the revised file that I made, but this file that was sent for revision and I have sent the revised results to the Author ID account: IJEP/2115/22 : Authentic Assessment Development Science to Assess Student Competence. .

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Author

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Best regards

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It is required to provide us with the grant no.

This research is supported by the State University of Makassar (**Grant number:**).

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Received, thank you.

Funding: This research is supported by the State University of Makassar (Grant number: 854/UN36/PL/2021).


Competing Interests: The authors declare that they have no competing interests. Authors' Contributions: All authors contributed equally to the conception and design of the study.


Thanks you

Author Muh. Tawil ID: IJEP/2115/22 :Authentic Assessment Development Science to Assess Student Competenc

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Fri, Feb 17, 2023 at 1:17 PM

Thanks a lot. for the publication of the manuscript with ID: IJEP/2115/22 :Authentic Assessment
Development Science to Assess Student Competence

Greetings

Author

Muh. Tawil

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AUTHENTIC ASSESSMENT DEVELOPMENT SCIENCE TO ASSESS STUDENT
COMPETENCY

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²⁾Physics Education Study Program, FKIP Muhammadiyah University Makassar, Indonesia,

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Abstract. This study aims to: to find authentic models of science assessment in assessing the competence of senior high school students who meet the criteria: (1) validity, practically, effectiveness, (2) The results of students in the high category, and (3) The response of students and teachers on the implementation of positive science authentic assessment models. The model used is the development of a general educational development of Plomp, T (Fauzan et al., 2013) and the theory of quality material (product) Nieveen (Tjark Huizinga et al., 2013). The result of the development of science authentic assessment (SAS) models meet the following criteria: (1) validity, practically, effectiveness, (2) the learning outcomes of students in the category of high, (3) a positive student response. Model of authentic assessment is very worthy science applied in teaching science for assessing the competence of senior high school students.

Keywords: science authentic assessment, validity, practically, effectiveness,

Contribution/ Originality: This research produces an authentic assessment that meets validity, practicality, effectiveness

1. Introduction

Teachers, and learning process.. They view that the curriculum is first assessment: something continuous, interrelated all happening at the same time, and both strongly influence each other as, assessment process as an integral part of learning.

[Kurniawatia & Sukardiyono, 2018](#), seen only as a means for evaluation and the only tool for assessing classroom instruction is through paper and pencil tests. Student learning outcomes are measured based on what they have memorized at the expense of their conceptual understanding ([Mohamed & Othman, 2017](#); [Mongkuo & Meya, 2017](#) ; [Susani, 2018](#); [Suwartono & Cici, 2019](#); [Alhouli & Khayatt, 2020](#)). Authentic assessment as a better substitute for paper and pencil tests ([Moria et al., 2017](#); [Suwartono & Cici, 2019](#); [Inayah et al., 2019](#); [Salirawati, 2021](#))

2. Theoretical Framework

2.1. Authentic Assessments

Complex situations authentic ([Wiethe-Korprich, & Sandra, B, 2017](#); [Sutarto & Jaedun, 2018](#); [Moria et al., 2018](#); [Suarimbawa et al., 2017](#); [Salirawati, 2021](#); [Centoni & Antonello, 2021](#)); Authentic assessment of educational achievement directly measures actual performance in the subject area ([Sutarto & Jaedun, 2018](#); [Sholihah, 2021](#); [Fynn & Elias, 2022](#)), picture students have show students is obtained ([Aiken, 2013](#)). In general examples of techniques authentic assessments are shown in Table 1.

Table 1. Techniques Authentic Assessments (Agus et al., 2021)

Students can demonstrate that activity involves complex skills that are difficult to be assessed through paper and pencil tests.	
Plan and carry out experiments	Creating graph data
Writing stories, essays, poetry	Creating the chart
Give oral reports	Noting the observations
Being a peer tutor	Asking question
Creating of Journal	Improvise
interviewing informants	Creating computer programs
Being in a local travel guide	Searching for information in the library
Correspond with authors science	and etc

Organizing authentic assessments as in Figure 1 (Agus et al., 2021)

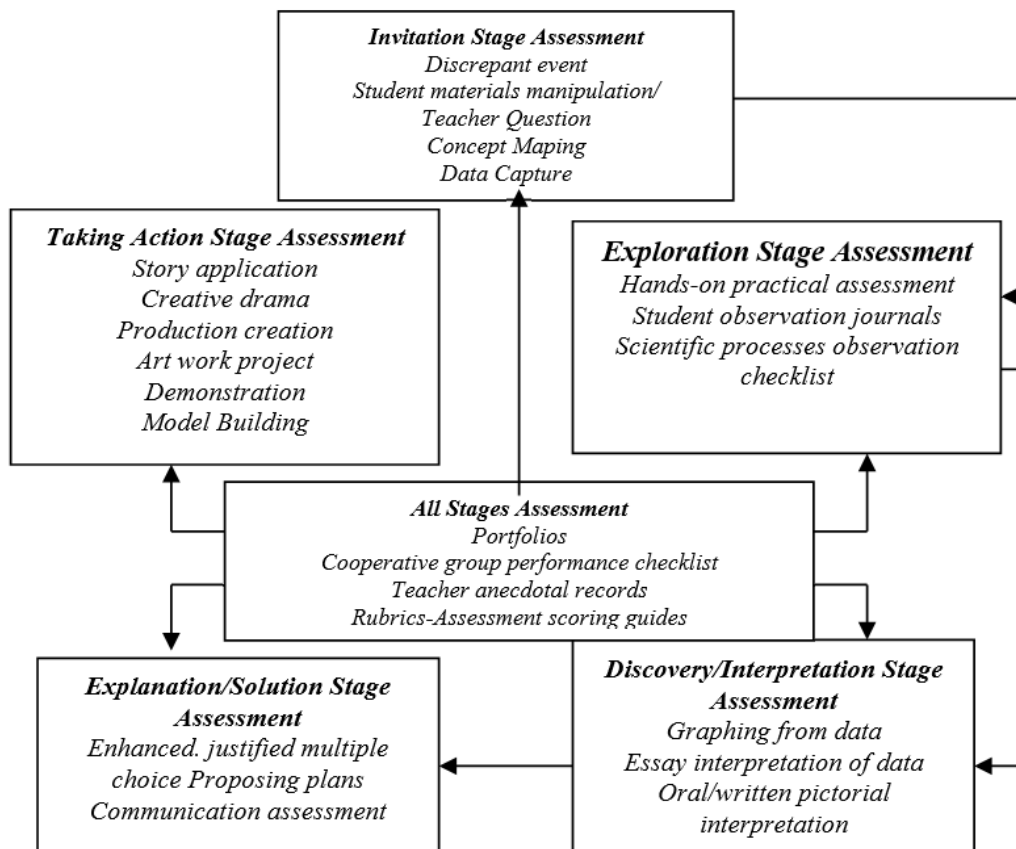


Figure 1. Authentic assessments organization in the learning cycle stage.

2.2. Implementation of authentic assessment

Implementation of authentic assessment at each stage can be described briefly (Kurniawatia & Sukardiyono, 2018)

1. Invitational stage

Authentic assessments aimed to obtain information about the initial understanding of the students on a particular topic or concept. The technique can be used, among others, asking questions orally or in writing teacher-oriented to provoke students' opinions, presenting photos or illustrations that demonstrate a process or a particular situation.

2. Exploration stage

At this stage, the assessment aims to explore the ability of science process skills in students. Assessment used may be hands-on/minds-on activity includes the assessment of student activities and student observation journal.

3. Explanation stage

Authentic assessment done on the competence of students in observation, analysis, and communication.

4. Actions stage

At this stage, the assessment aims to uncover the student's ability to apply his understanding of a concept in other situations. The resulting product can be student demonstrations, role playing, oral or written communications, handicrafts, and others.

3. Method

3.1. Types of research

This research includes developmental research. The development of authentic assessment models or SAS models and instruments required. The development of research-oriented products SAS models qualified in the aspect of validity, practically, and effectiveness.

3.1. Research Sites

This research was conducted in senior high school Sungguminasa in accordance with the needs of the development of science authentic assessment (SAS) models.

3.2. Participants

The subjects were students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. Number of research subjects in the test phase as many as 30 students.

3.3. Development operational

Operational development of authentic models of science assessment fig. 2.

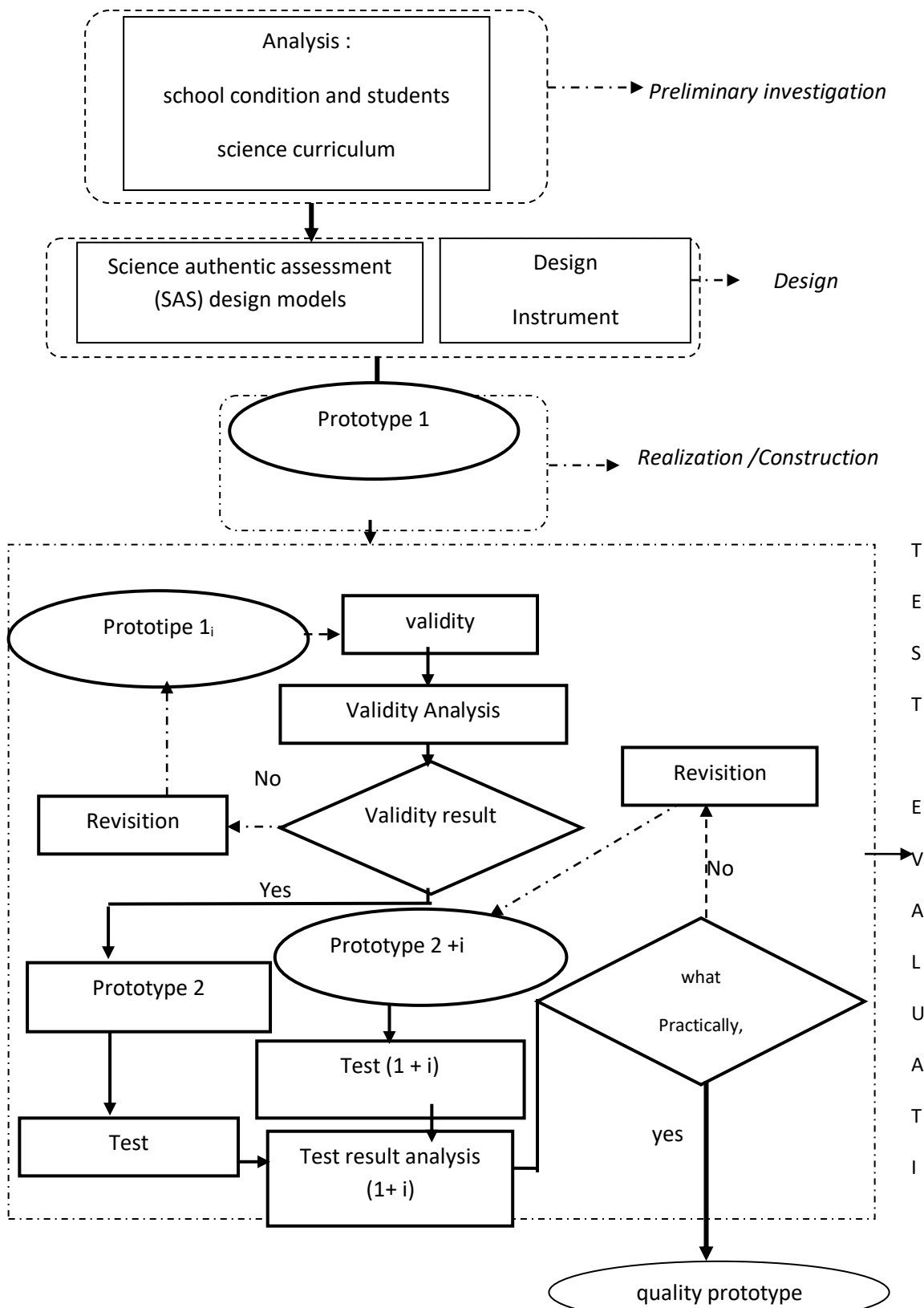


Figure 2. Development Operational SAS Models

Remarks :



: activity Process



: requirement results



: development operational



: main flow



: activity results



: needs if syclus process

Operationally the development of SAS models done simultaneously, so that when the validity of the model SAS criteria have not been met, then when revising the devices (partially or completely) done simultaneously revise SAS models support device and related instruments. Suppose revisions subject matter, it is done simultaneously revisions to the plan of teaching, and performance assessment tasks and rubrics.

3.4. *Instrument*

Instruments consisted of (1) SAS models validation sheet; (2) science achievement test; (3) questionnaire; and 4) the observation sheet. Instrument is validated by five experts associated with the evaluation and validation of the content of the construct validation. The tests showed that these instruments eligible for use in research.

3.5. *Data Analysis*

Data validity analysis, practicaly, and effectiveness analysis using the theory Neveen ([Huizinga et al., 2014](#)) and [Veugen et al, 2021](#), in Table 2.

Table 2. Material Quality

Quality Aspects		
Validity	Practicality	Effectiveness
<i>Intended (idea+ Formal :</i>	<i>Consistency between</i>	<i>Consistency between</i>
<i>-state of the art knowledge</i>	<i>-intended ↔ Perceived</i>	<i>intended ↔ Experiential</i>
<i>-Internally consistent</i>	<i>-intended ↔ Operational</i>	<i>intended ↔ Attained</i>

Criteria for the categorization of quality SAS models using criteria by Bloom, [\(Fauzan, A, et al, 2013\)](#). with the following steps.

a. Calculate average results of the validation of formula $k_i = \frac{\sum_{j=1}^n v_{ji}}{n}$ with k_i = average, the results

b. Calculate average of formula $A_i = \frac{\sum_{j=1}^n k_{ij}}{n}$

k_{ij} : average sub-aspke i to j

n : the number aspect sub-aspects of the aspects of the i-th

c. Calculate for a mean total (MT) with the formula $MT = \frac{\sum_{j=1}^n A_i}{n}$,

Table 3. SAS Models Validity Criteria [\(Chakraborty et al, 2021\)](#)

Scor interval	Validity Criteria
$4 \leq MT \leq 5$	very high
$3 \leq MT < 4$	high
$2 \leq MT < 3$	less
$1 \leq MT < 2$	low

A Data analysis and the students' response to the implementation of the supporting components of SAS models and data from questionnaires to determine the A positive response,

meaning that students support, feel happy, interested in the components and the learning process through the implementation of SAS models. A negative response otherwise. To determine the achievement of the objectives of the activity implementation of SAS models in terms of the students' responses, when the the number of studied.

This is the degree of achievement of competence is the percentage of student mastery of the content and performance of the basic competencies of 80% of the basic competencies that have been set can be achieved ([Kristina et al., 2021](#)).

States, a program of teaching and learning activities otherwise very effective, if to reach benchmark reference value set beforehand. Because the matter refers to the indicators, the values obtained by the students representing the student's mastery of the indicator is represented by the question, so that the control indicators can be expressed as the total value obtained by the students.

The criteria stated mastery learning with application of SAS models are a minimum score 80 (the maximum is 100). Interval score determining the level of student mastery (LSM) categorized ([Kristina et al., 2021](#)).

Table 4. Criteria for Mastery Level Students'

Interval Scor	Category
$90 \leq \text{LSM} \leq 100$	Very high
$80 \leq \text{LSM} < 90$	high
$70 \leq \text{LSM} < 80$	less
$60 \leq \text{LSM} < 70$	low
$0 \leq \text{LSM} < 60$	Very low

4. Result

4.1. Environmental Needs Analysis

Based on the results of the response to 350 parents, about the implementation of the assessment Science in schools found that almost all parents want their information on the progress of the learning progress siswa from time to time and comprehensively, namely the development in cognitive, affective, and psychomotor aspects. This trend indicates that the marking system "paper and pencil test" (written test) conducted in schools during this time should be time takes a form of alternative assessment as a complementary system of written test. It is very urgent to do given that written tests can not assess all students' abilities, on the other hand people have a tendency to get

information about the three aspects. This is in accordance with the opinion of [\(Svidzinskaya et al., 2019\)](#) and [Miller-Young et al, \(2021\)](#), which states that by applying the assessment, the student's attitude competence can be measured

The assessment system that can address the needs of this community one of them is a model of SAS, it is quite reasonable, therefore, SAS models is one kind of assessment that has a philosophy of continuous assessment. The philosophy states that people eat to get the picture on the profile of the students, then of course the student should be photographed from all sides, not only in terms of cognitive, but affective, and psikomotornya aspects need to be considered. These three aspects of this ability is absolutely developed simultaneously, as required in the curriculum of 2013.

On the results of this survey also found the information interesting to observe. First, in general, people wish that the assessment criteria used in the school to be communicated to students. It means that the assessment criteria used in assessing performance results (assignments, papers, daily tests) in school it was time delivered to students. Second, the public generally believes that students need to be included in assessing performance outcomes, it means that the community is aware of their students need to be trained assess themselves against the results of its performance. Therefore with melatihkan this ability, the students will be able to determine the "weakness" and "strength" has, so that in the end the students can have the ability to overcome the problems faced in everyday life. This is in accordance with the opinion of [\(Alhouli et al., 2020\)](#) and [Syaifuddin, \(2020\)](#), which states that by applying the assessment, student skill competencies can be measured

The public need information about the assessment criteria can be answered by applying SAS models, because in this SAS model of the assessment criteria for every aspect of the student's performance has been set and similarly about self assessment. In the model of SAS students assess themselves, both self-assessment and assessment of the results of their performance themselves against participation in the group. Assessment of student' performance results in SAS models, teachers and students kduanya provided a score for performance results.

The results of survey studies the response of parents as one of the elements in the community, it can be said that people's needs is in accordance with the benefits rather than the model SAS, namely by applying the SAS models in the school, the parents/guardians of students able to: (1) identify the weaknesses and strengths students in learning. This can be achieved, because each performance results achieved by students, the parents make comments/response to the achievements of the son/daughter. Parents have the opportunity to provide motivation and expression of expectations to

be achieved; (2) penentuan kind of guidance to be done by the parents of students for achievement son/daughter, and (3) improvement of communication with the school in educating students.

The questionnaire results of five teachers of science in senior high school Sungguminasa, obtained information that in general teachers do not do the "feedback" to the results of performance (tasks, daily tests, and repeat the semester) their students, sometimes giving information on the assessment criteria, and never give a chance to students to assess themselves against the results of its performance. It means that there is a gap between the needs of the community with the implementation of the system of assessment in schools. Society nowadays need information how the learning progress of students in the school from time to time and in a comprehensive manner, the criteria used in the assessment, and trained students assess themselves, on the other hand it turns out these needs are not fully met.

The survey results mentioned above, this information reinforces the need to develop SAS models questionnaire results from 350 students showed that the suitability of the information contained on the teacher and the information from students, and students in general have a tendency to know the progress of learning results. It means that all the results of student performance over time needs to be informed, so that students can find out how their learning progress. The survey results of laboratory equipment, it still needed some laboratory equipment to support the implementation of SAS models. Laboratory equipment needed are: (1) tools calorimeter; (2) technical balance tool, and (3) expansion tool agent. The equipment is borrowed from physics laboratory, State University of Makassar. This can be realized because of the cooperation between the senior high school Sungguminasa and the University of Makassar. While the means of tables, benches, and laboratory equipments to support the implementation of SAS models. Therefore the form of tables, rectangular practicum students then setting the seating positions facing each other in the student made scientific activities (activities observing and experimenting). From the survey result means seating and tables that show the ingredients lab strongly supports the implementation of SAS models.

4.2. Analysis Curriculum

4.2.1. *Analysis front end*

SAS model development is done to enhance the assessment system in cooperative learning and assessment models Hibbard. In the cooperative learning, assessment component is still some weaknesses. The weaknesses include more emphasis on the assessment of learning outcomes achieved by students at the end of the lesson and less emphasis on assessment of student performance results. To complement these weaknesses SAS models then developed a model based on the model asesemen Hibbard. However, on the model of Hibbard's assessment there are still some weaknesses that need to be improved, including the absence of a self assessment against the group and there is no element of motivating both teachers and parents/guardians of students. On the other hand, this element is one element that is needed by the community in accordance with the results of surveys that have been described previously.

SAS models development is needed grounding theories were strong and intertwined between the theory and other theories. Based on the results of the literature review obtained several theories that support the development of models of SAS include: (1) understand kognitivistik; (2) understand konstruktivistik: learning theory Piaget, learning theory Vygotsky, learning theory Bruner, learning theory Polya; (3) learning theory Ausebel; (4) Malmivuori learning theory; (5) theory class assessment: Herman, Ascbacher, and Winter, (6) theory class assessment Webb; (7) the theory of authentic assessment. According to his assessment of education experts and scientific experts who becomes validator in this study stated that these theories are very powerful and interlinked between the theory and other theories. These theories are very eligible as supporting theory in the development of SAS models.

4.2.2. *Analysis of students*

The results of the initial analysis of the ability of mastering the concept of temperature and heat of 371 students, obtained information that many concepts of temperature and heat are not yet mastered by the student. It is shown from the results of the initial test material temperature and heat, the average score was only 4.85. There are only two classes who gets an average score above six. Based on this information, the concepts are not yet mastered by the student still needs to be given to the student book.

Students in participating in the implementation of SAS models are divided into groups, each group consisted of five students. In this group division is based on ability, gender, and type of parts. Information about the ability, gender, and type of tribal students obtained from the survey results.

The data obtained from the student's ability documentation data Certificate of Examination Results. On the distribution of group members based on the theory of the division of Lie groups. The group division based on gender, and type of parts it is possible to do, because based on the data from the survey found that the ratio between the number of female students and male almost as many, nor about the type of clan (Bugis and Makassar tribe).

In this study, in addition to the information level of student ability, gender, and ethnicity are also needed information on the work of parents. The data about the job of parents is needed, because in the implementation of SAS models include aspects of the comments of parents on student achievement that has been accomplished. Based on the survey results, the work of parents/guardians support the implementation of SAS models, because in general the parents/guardians of students have a higher education. It means that all parents/guardians of students able to provide comments / feedback on the performance of their child.

The questionnaire results from 350 students, obtained information that the desire of the parents/guardians of students and students themselves have the same tendency, which both require assessment of learning outcomes of physics in schools is done from time to time and thoroughly (cognitive, affective, and psychomotor), the need for "feedback" immediately, and the assessment criteria used by teachers need to be delivered to students.

4.2.3. Analysis material

In the analysis phase begins with the material provides the initial test to 390 students. Initial test material is the material temperature and the heat that has been studied by students. This initial test aims to determine the concepts of temperature and heat. Which has not been mastered by the students as a prerequisite to the concepts of temperature and heat the material. Results from this information, as a basis model of SAS software development by incorporating these concepts into their teaching.

Based on the results of this initial test, there are some concepts and understanding of the material and the temperature of heat required to be disclosed in the students' books. Concepts that still need to be "suppression" in the implementation of SAS models are: (1) the concept of temperature; (2) comparative scale thermometer, thermometer function concept, and the concept of the type of liquid in a thermometer; (3) the concept of water anomaly; (4) The heat unit concept, the concept of heat transfer; (5) the concept of specific heat, and the heat capacity; (6) the sense heat of evaporation, condensation understanding, and understanding the melting heat.

The results of the analysis of the structure of the content that was developed based on the contents of Curriculum 2013, in particular temperature and heat the material, it was found that the 2013 science curriculum senior high school is no longer the elaboration of indicators. It means that teachers are required to create indicators and specific learning objectives. Based on this information, it is in the development of learning tools described pembelajaran indicators and objectives specific to each Lesson Plan, and in each of the learning plan comes with authentic assessment sheet.

The task analysis was conducted to identify the stages of completion of tasks in accordance with the temperature of the material and heat. Analysis of these tasks include the analysis of the content and concept analysis. The final result of the analysis contained in the task of "student 'performance, and authentic assessment sheet).

The results of observations of two observers on the ability of the students in the psychomotor aspects included in the high category with average yield of psychomotor abilities of 91. Similarly, the tasks implemented on SAS models, in the form of task performance which consists of duty to report the results of observations or experiments, in general, students do well, it can be seen from the result of the ability of process skills which the average value of students reached 81 on the pilot phase of 90, the task doing the competency test in general students can do, it can be seen from the average results study on cognitive aspects in pilot phase 90. the task of the students assess themselves against the results of self-assessment of its performance and its participation in the group also generally do well, as seen in the learning outcomes in the affective aspects of 82 on the pilot phase of 90, and when analyzed data from observations of two observers show that all students are engaged in class discussions, conduct cooperation in scientific activities, ask the same friends and teachers, provide ideas. Similarly, data from the questionnaire results in the affective aspect of learning outcomes showed that the results were consistent with the observations and the results of the students' statements within the SAS models, all of which showed average values above 80. It was proved that the learning outcomes of students in a very affective aspects reliable. That is, there is a match between the observer and the statement of the results of a respondent. While the selection task, and the task of reflection also on the subject matter students are generally well done, but the results rather than the student's performance is not analyzed further, because the results of the performance of these tasks is the result of group work done at home. However, that does not mean it has no effect on the motivation of the students, because the value of the group is taken as a reference in awarding the prize to the group. This scenario is delivered to students, so that they are motivated to do the work of the group, both in completing observation or experiment, and perform tasks in the home.

The results of the analysis of the information indicates that some of the concepts of temperature and heat that previously have not been mastered by students based on the results of the initial tests (material temperature and heat in Junior high school) at the time participated in the implementation of the model SAS these concepts can already be controlled, which is reflected in the value of the average learning results obtained during the implementation of SAS models by 79 in the test phase at 90. While the average initial test results only 40.

The results obtained from the analysis of the concept of teacher responses indicate that 100 percent of teachers said that the analysis of this concept is very helpful in implementing SAS models. It means that the analysis of the concept is practically implemented in SAS models.

4.3. SAS Models Validation Results

Data content includes the validation results supporting theories SAS models development and validation constructs include constructs linkages between components of SAS models in the category of valid and fit for use. The results of the validation content and construct models of the SAS in Table 5- 6.

Table 5. Data Validation Results Module SAS Content

No	Rated aspect	the Average aspect Ai
1.	Supporting theory model of SAS	4.1
2.	Step-by-step implementation model of SAS	3.9
3.	The social system in the implementation model of SAS	3.9
4.	The principle of the model management reaction SAS	4.0
5.	SAS models support system implementation	3.9
6.	Impact of the implementation and impact of the model companion SAS	4.0
7.	Implementation of the model of SAS	4.1
8.	The learning environment and management duties SAS models	3.8
9.	SAS models evaluation	3.9
The average total (VR) = 3.9		

Expert commentary

Rate In general expert states that the theories that support the development of authentic assessment science is very solid and intertwined among the theories described in SAS models. The suggestions of the expert of which is in the handbook and supplements SAS models should be made more compact (without reducing essential things) that have high readability and acceptability. All devices are generally decent SAS models used in the field for data retrieval research. Revisions to the book model of SAS on the criteria for assessment of the results of scientific activity, namely criteria: create questions, formulate problems, make hypotheses, create tables, create graphics, reading charts, making predictions, designing experiments (formulate variable manipulation, response variables, control variables, manipulation variable definition, the definition of control variables) and make inferences.

Table 6. Data Validation Results Construct Components SAS Model

No	Rate Aspects	the Average aspects Ai
1.	SAS model components	3.9
2.	SAS models support the theory	4.1
3.	Step-by-step implementation of SAS models	3.8
4.	The social system in the implementation of SAS models	3.8
5.	Reaction principle management SAS models	3.9
6.	SAS models	3.8
7.	the implementation Bridesmaids SAS models	3.6
8.	Implementation of SAS models	4.1
9.	The learning environment and management duties models SAS	3.7
10.	SAS model evaluation	4.3
The average total (VR) = 4.2		

Expert commentary

In general, states that the link expert contents of the components of SAS models are interrelated and do not find any contradiction between what the contents of the book with the device SAS models. Comments and suggestions from the expert including SAS models guidebook

packed with modern learning theory is very relevant to the central theme of research. The handbook should be made more compact, attractive and avoid some mistakes topography.

Data validation results SAS model development support device consisting of Table 6: planning for learning; Table 7: task authentic assessment; Table 8: result validity assessment authentic supplement, Table 9: guidelines for teachers; Table 10: guidelines for students, and Table 11: book of students all supporting devices in the category of valid and fit for use.

Table 7. Lesson Planning Data Validation Results

No.	Rate Aspects	the Average aspects Ai
1	Indicator	3.9
2	The contents of the subject matter	4.0
3	Language	3.8
4	Time	3.9
5	Teaching methods	3.7
6	Learning Closed	3.9
Average Total (VR) = 3.8		

Table 8. Date of Validity Result Student' Aktivty Sheet

No	Rate Aspects	the Average aspects Ai
1	Organisation	4.0
2	Prosedure	3.7
3	Question/Problem	3.7
Average Total (VR) = 3.9		

Table 9. Date of Validity Result Authentic Assessment Supplement

No.	Rate Aspects	the Average aspects Ai
1	Organisation	3.9
2	Prosedure	3.9
3	Question/Problem	3.9
Average Total (VR) = 3.9		

Table 10. Data Validation Results Teacher Manual

No	Rate Aspects	the Average aspects Ai
1.	Introduction	3.9
2.	Science probelem representation	4.2
3.	Learning method	3.8
4.	Learning closed	3.9
Average Total (VR) = 3.9		

Table 11. Data Validation Results Student Manual

No	Rate Aspects	the Average aspects Ai
1	Sub organization concept	3.6
2	Translation of troubleshooting steps temperature and heat	3.9
3	Activity	4.4
4	Learning closed	4.2
Average Total (VR) = 3.9		

Table 12. Data Validation Results Student Book

No	Rate Aspects	the Average aspects Ai
1	Translation of material	3.9
2	Construction	3.9
3	Exercise	4.0
Average Total (VR) = 3.9		

Science achievement test consisting of a test product, scientific knowledge tests, and performance tests at tested to 43 students. The test consists of 24 items of products, after testing produced 23 items that valid and an invalid item. The tests show that the contents of the item 23 to be able to represent all the material temperature and heat with the level of reliability .99. Scientific knowledge test consists of 23 items, after testing produced 23, is .99. The performance test of 10 items, after testing produced is .72.

4.4. Effectiveness of Models SAS

Table 11 below shows the results of teacher feedback on the effectiveness of the implementation of SAS models. The teachers in assessing the effectiveness of using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

Table 13. Data Execution Effectiveness SAS Models

No	Rate Aspects	the Average aspects Ai
1	Student learning outcomes	4.1
2	Student Response Against Components and Implementation Process SAS models	4.1
Average Total (VR)= 4.1		

4.5. Practicality of Models SAS

Table 14, below shows the practicality of the model based on the observation SAS with implementation SAS models support device

Table 14. Data Implementation Device Supporting SAS Model

No	Rate Aspects	the Average aspects Ai
1	Measures Implementation of SAS models	3.1
2	Social Systems Implementation of SAS models	3.9
3	Reaction Principle Management SAS models	3.8
IO Value or Value Average Total (VR) = 3.6		

Remarks:

IO is intended \leftrightarrow Operational

Science achievement test scores found that the level of student mastery (LSM) of the subject matter of science high 90 and 100 percent of students completed. Students' response to the implementation of SAS models is a slight positive, according to the teacher's response to the ease of implementing SAS models is positive

Table 13 following several students comment on questions related to the implementation of SAS models support device.

1. Are you able to understand the language used in the book Student, Student Worksheet, Student Manual, and supplements SAS?
2. Are you interested in the appearance (text, large font, image, layout images, colors) books Student, Student Worksheet, Student Manual, and supplements SAS?

Table 15. Data Comments Student Questionnaire Response to The Question On

No.	Comment	
	first question	the second question
1	Yes, because all of a language that is very easy to understand	Yes, because in the book Student, Student Worksheet, Student Manual, and supplements SAS already written clearly accompanied by images that can allow me to learn.
2	Yes, the explanation of the book Student, Student Worksheet, Student Manual, and supplements SAS easy to understand and clear explanation	Yes, because the appearance of such a book Students, Student Worksheet, Student Manual, and supplements SAS students will be more interested in reading and with their images with easy to understand explanations.
3	Yes, because the language used is the language and its standard sentence too short and clear so easy to understand.	Yes, because with the article with pictures easier for students to understand the intent rather than the text.
4	Yes, I can understand the language used in the book Student, Student Worksheet, Student Manual, and supplements SAS	Yes, because if the appearance of text, large font, image, layout and color pictures in books Student, Student Worksheet, Student Manual, and supplements SAS, the learning atmosphere we will not boring and happy doing his work.

Table 16, below shows the results of the responses of six education experts regarding enforceability of SAS models theoretically in the field. Educational experts in assessing the enforceability of SAS models in the classroom by using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

Table 16. Data Expert Responses Regarding the implementation of SAS Model

No	Aspects Observed and Judged	Average aspect Ai
1	SAS models implementation procedures	4.2
2	Social system implementation model of SAS	4.2
3	Principle reaction models management SAS	4.3
Average Total = 4.2		

Table 17, below enforceability of data models in a class derived from the observation of two (2) people watchers. Observers in observing the implementation of SAS models during seven meetings using assessment scores: 1 is very low; 2 is low ; 3 is sufficient; 4 is high; 5 is very high.

Table 17. Data Observations Observers On implementation of SAS Models

No	Aspects Observed and Judged	Average aspect Ai
1	SAS models implementation procedures	4.2
2	Social system implementation models of SAS	4.3
3	Principle reaction models management SAS	4.2
Average Total = 4.2		

Ratings among experts on the implementation of SAS models is theoretically consistent with the observation observer SAS model implementation in the classroom sebear 4.2 it indicates that that the application of SAS models in practical classes.

5. Discussion and Conclusion

5.1. Discussion

The analysis of the validity and practicality found that SAS models support device is valid criteria and practical criteria applied in assessing student competence. Student competency can be assessed in a comprehensive and sustainable. [Muho & Taraj, \(2022\)](#), found that formative assessment practices affect students' motivation in learning English.

Student learning outcomes include cognitive aspects (products and processes), affective, and psychomotor aspects obtained from the authentic supplement the assessment indicates that results for students in the pilot phase already meets the standards of competence specified achievement. This is caused because all the planning done well. Similarly, the results obtained from the student learning achievement test at the end of the implementation of the model. This means that the device is SAS models meet the criteria effectiveness. [Chi et al., \(2021\)](#), conducted a study related to comparing student science, found for participants.

Results of student and teacher responses to the components and implementation of SAS models show a positive response. It shows that in the aspect of student and teacher responses to the components and implementation of SAS models meet the criteria of effectiveness. That is, the entire device is SAS models support the implementation of learning in the classroom is expected that students will be more motivated to learn science.

Based on the results of this questionnaire are generally teachers found the necessary and feasible SAS models developed on the subject of how to do more with the device making training and accompanied by the provision of laboratory equipment in accordance with the required media in the implementation of the SAS models. Similarly, the teacher stated that the strategy of implementation of SAS models can be used as a primary strategy in learning science. [Vahidnia et al., \(2021\)](#), also developed and validated an instrument of student attitudes towards teachers to find differences in the level of student attitudes

Both results are very appropriate response to the comments of experts based on their knowledge and experience theoretically. It proved empirically SAS model implementation in the field which is derived from the observation of two (2) observers indicate that the average yield assessment scores of both observers in the high category and reliable. Thus, it can be said that the implementation of SAS models is theoretically supported by empirical data in the field with high reliability. That is, the implementation of SAS models although observed by different people and

different conditions will give consistent results. [Toma, \(2020\)](#), developed Instrument and psychometric evaluation

Teachers initially still faces obstacles in implementing SAS models, it is because, as a model system SAS is a form of assessment and learning system innovation. As it like an innovation, then the SAS models requires a shift in perspective from teachers, the community, including a shift in perspective parents. Changing the way it is not an easy task, but requires hard work and commitment. Teachers are required to be able to pay attention to individual students, monitor progress, encourage them more activity, collecting every student work to be comments, and so forth. All it requires extra time and effort. Therefore, teachers lack strong motivation in their profession, it would be difficult to implement this SAS models. The difference between this study and that developed by [Chen et al., \(2020\)](#) and [Matsumoto-Royo & Ramírez-Montoya \(2021\)](#), is only Instrument Knowledge development.

In the next phase, the teachers have been able to overcome the obstacles perceived in the early stages. Teachers, giving students the opportunity to assess themselves to the task with a friend based on the guidelines asesment autgentic. Teachers keep checking on the results of this self-assessment. The impact than self assessment is that it will foster honesty of students in doing the job. SAS Models has some weaknesses in the implementation of the class are: (1) due to the limitations of the researcher, only two observers to observe social skills, psychomotor skills of students, and enforceability of SAS models. This is done with the consideration that if the use of many observers, it can affect the process of implementation of SAS models in the classroom; (2) observation of social skills, and psychomotor skills performed in all groups. This is done with the consideration that social skills and psychomotor skills a person can not be sampled for other people. All information to assess social skills and psychomotor skills, then observations were made only one group at each meeting. Since a lot of meetings in the implementation of SAS models as much as seven meetings either at trial. The disadvantage of this observation is the observation frequency becomes a little bit, but the excess all students accessed.

5.2. Conclusion

Conclusions of this study resulted in SAS models qualified products meet the criteria of validity; practicality and effectiveness. The results of students in the high category and the response of students and teachers on the implementation of positive SAS models. This is in accordance with the opinion of [\(Walter et al., 2021\)](#). which states that by applying the assessment, students' knowledge competence can be measured [\(Setyawarno & Kurniawati, 2018\)](#).

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Reference

- Agus, K., & Suprianti, G.A.P. (2017). An Analysis of Authentic Assessment Implementation Based on Curriculum 2013 in SMP Negeri 4 Singaraja. *Journal of Education Research and Evaluation*. 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Aiken, L. R. (2013). *Tests Psicológicos y Evaluación*, México. Pearson. <https://books.google.co.id/books?>
- Alhouli, A. I., & Alkhayatt, A. K. A. (2020). Assessing the soft skills needs of teacher education students. *International Journal Of Education And Practic*, 8(3), 416-431. <https://doi.org/10.18488/Journal.61.2020.83.416.431>
- Azim, S., & Khan, M. (2012). Authentic assessment: An instructional tool to enhance students learning. *Academic Research International*, 2(3), 314-320. http://ecommons.aku.edu/pakistan_ied_pdcc/11
- Carin, A. A. (2017). *Teaching Science Through Discovery* (eight ed). New Jersey: Prentice Hall, Inc. https://www.google.co.id/books/edition/Teaching_Science
- Centoni , M., & Antonello, M. (2021). Students' evaluation of academic courses: An exploratory analysis to an Italian case study. *Studies in Educational Evaluation*. 70, 101054. <https://doi.org/10.1016/j.stueduc.2021.101054>. www.elsevier.com/locate/stueduc.
- Chakraborty, S., Dann, C., Mandal, A., Dann, B., & Paul, M. (2021). Effects of rubric quality on marker variation in higher education. *Studies in Educational Evaluation*. 70, 100997. <https://doi.org/10.1016/j.stueduc.2021.100997>
- Chen, Bo., Lijun C., Xianhua, M., Minjie, Y., & Miaomiao, S. (2022). Development and validation of an instrument to measure upper-secondary school science teachers' perceived practical knowledge about practical work. *Journal of Baltic Science Education*. 21(1),26-37 <https://doi.org/10.33225/jbse/22.21.26>
- Chi, S., Xiu F. L., & Zuhao, W. (2021). Comparing student science performance between hands-on and traditional item types: A many-facet Rasch analysis. *Studies in Educational Evaluation*. 70, 100998. <https://doi.org/10.1016/j.stueduc.2021.100998>

- Duncan, N. (2012). Beyond testing: towards a theory of educational assessment. *Professional Development in Education*. 38,(4), 691-693 [https://doi.org/ 10.1080/19415257.2012.662397](https://doi.org/10.1080/19415257.2012.662397)
- Fauzan, A., Plomp, T., & Gravemeijer, K. (2013). The development of an RME-based geometry course for Indonesian primary schools. In T. Plomp, & N. Nieveen (Eds.), *Educational design research – Part B: Illustrative cases*. 161-177. [.https://pure.tue.nl/ws/portalfiles/portal/3900348/23590380570408.pdf](https://pure.tue.nl/ws/portalfiles/portal/3900348/23590380570408.pdf)
- Fynn, A., Elias, O. M. (2022). Continuous online assessment at a south african open distance and e-learning institution. *Frontiers in Education Original Research*. 27, (79), 1-13. <https://doi.org/10.3389/feduc.2022.791271>.
- Huizinga, T., Handelzalts, A., Nieveen, N., & Voogt, M.J. (2014). Teacher involvement in curriculum design: need for support to enhance teachers' design expertise. *Journal of Curriculum Studies*. 46, (1), 33-71. <https://doi.org/10.1080/00220272.2013.834077>
- Inayah, N., Komariah, E., & Nasir, A. (2019). The practice of authentic. Assessment in an EFL speaking classroom. *Studies in English Language and Education*, 6(1), 153-163, <https://doi.org/10.24815/siele.v6i1.13069>
- Karunanayaka, S. P., & Naidu, S. (2021). Impacts of Authentic Assessment on the Development of Graduate Attributes. *Distance Education*. 42(2), XX-XX. <https://doi.org/10.1080/01587919.2021.1920206>.
- Kartowagiran, B., & Amat, J. (2016). Authentic Assessment Model To Assess The Junior High School (JHS) Students' Learning Outcomes: The Implementation Of Authentic Assessment In JHS. *Jurnal Penelitian dan Evaluasi Pendidikan*. 20,(2),131-141. [http://dx.doi.org/ 10.21831/ pep.v20i2. 0063](http://dx.doi.org/10.21831/pep.v20i2.0063).
- Koh, K., Tan, C., & Ng, P.T. (2012). Creating thinking schools through authentic assessment: The case in Singapore. *Educational Assessment, Evaluation and Accountability*, 24(2), 135-149. <http://dx.doi.org/10.1007/s11422-008-9092-2>.
- Kurniawatia, A., & Sukardiyono. (2018). The development of authentic assessment instrument to measure science process skill and achievement based on students' performance . *JPPPF (Jurnal Penelitian dan Pengembangan Pendidikan Fisika)*. 4(2),65-74. <https://doi.org/10.21009/1.04203>.
- Kristina, K. W., Tanya, B., & Daniel, M. F. (2021). The application of mastery criterion to individual operants and the effects on acquisition and maintenance of responses. *Journal of Behavioral Education*.1-23 [https://doi.org/ 10.1007/s10864-020-09420-3](https://doi.org/10.1007/s10864-020-09420-3).
- Matsumoto-Royo,K., & Ramírez-Montoya, S. M. (2021). Core practices in practice-based teacher education: A systematic literature review of its teaching and assessment process *Studies in Educational Evaluation*. 70, 101047-1-13. <https://doi.org/10.1016/j.stueduc.2021.101047>.

- Miller-Young, J., Marin, F. L., Poth, C., Vargas-Madriz, F. L., & Xiao, J. (2021). The development and psychometric properties of an educational development impact questionnaire. *Studies in Educational Evaluation*, 70, 101058-12. <https://doi.org/10.1016/j.stueduc.2021.101058>
- Mintah, J. K. (2003). Authentic assessment in physical education: prevalence of use and perceived impact on students' self-concept, motivation, and skill achievement. *Measurement In Physical Education And Exercise Science*, 7(3), 161–174. https://doi.org/10.1207/S15327841MPPE0703_03
- Mohamed, R., & Othman, L. (2017). Authentic assessment in assessing higher order thinking skills. *International Journal of Academic Research in Business and Social Sciences*, 7(2), 466-476. <https://doi.org/10.6007/IJARBSS/v7-i2/2021>.
- Mongkuo, M. Y., Meya, Y., & Mongkuo. (2017). Testing the factorial equivalence of the collegiate learning assessment performance task diagnostic instrument across lower class and upper class predominantly black college students. *International Journal Of Education And Practice*, 5(6), 95-103. <https://doi.org/10.18488/Journal.61.2017.56.95.103>
- Moria, E., Refnaldi, & Zaim, M. (2018). Using authentic assessment to better facilitate teaching and learning: the case for students' writing assessment. *Advances in social science, Education and Humanities Research (ASSEHR)*, 148. <https://doi.org/10.2991/icla-17.2018.57>
- Muho, A., & Taraj, G. (2022). Impact of formative assessment practices on student motivation for learning the english language. *International Journal of Education and Practice*. 10,(1), 25-41. <https://doi.org/10.18488/61.v10i1.2842>
- National Center for Fair & Open Testing (1992). *What Is Authentic Assessment?* Cambridge, MA. NCFOT. <http://jfmuller.faculty.noctrl.edu/toolbox/whatisit.htm>
- Syaifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*, 9(4), 1491-1502. <https://doi.org/10.12973/eu-jer.9.4.1491>
- Salirawati, D. (2021). Authentic assessment in the pandemic period. *Journal of The Indonesian Society of Integrated Chemistry*. 13(1), 21-31. <https://doi.org/10.22437/jisic.v13i1.11716>.
- Setyawarno, D., & Kurniawati, A. (2018). *Journal of Science Education Research*. 2(2),47-55. <https://journal.uny.ac.id/index.php/jser/article/view/22468>
- Sholihah, M. (2021). Authentic Assessment in Online Learning During The Covid-19 *Pandemic*. *Edunesia: Jurnal Ilmiah Pendidikan*, 2 (2): 576-580. <https://doi.org/10.51276/edu.v2i2.167>
- Susani, R. G. (2018). The Implementation Of Authentic Assessment In Extensive Reading *International Journal Of Education*. 11(1),87-92. <http://Dx.doi.Org/10.17509/Ije.V11i1.9113>.
- Sutarto, H. P., & Jaedun, M. P. D. (2018). Authentic assessment competence of building construction teachers in indonesian vocational schools. *Journal Of Technical Education And Training (Jtet)*. 10,(1). <https://10.30880/Jtet.2018.10.01.008>

- Suarimbawa, A.K., Marhaeni, A. A. I. N., & Suprianti, G. A. P. (2017). An Analysis of Authentic Assessment Implementation Based on Curriculum 2013 in SMP Negeri 4 Singaraja. *Journal of Education Research and Evaluation*. 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Suwartono,T., & Cici, R. (2019). Authentic assessment in elt: hopes, challenges, and practices. *Refleksi Edukatika : Jurnal Ilmiah Kependidikan*. 9(2), 113-120.<http://Jurnal.Umk.Ac.Id/Index.Php/Re>.
- Svidzinskaya, G. B., Baskin, Y. G., & Mezentseva, M. E. (2019). Using the semantic differential method to assess the learning motivation and attitude of first-year student's towards chemistry in university of emercom of Russia. *International Journal Of Education And Practice*.7,(2), 88-100. <https://doi.org/10.18488/Journal.61.2019.72.88.100>.
- Toma, B. R. (2021). Measuring children's perceived cost of school science: Instrument development and psychometric evaluation. *Studies in Educational Evaluation*. 70, 101009. <https://doi.org/10.1016/j.stueduc.2021.101009>
- Vahidnia, F., Behzad, G. H., & Hesamoddin, S. (2021). Development and validation of students' attitudes towards teacher's pet phenomenon scale in the higher education setting: Differences by levels of study and Grade-Point-Average. *Studies in Educational Evaluation*. 70, 101000. <https://doi.org/10.1016/j.stueduc.2021.101000>.
- Veugen, M.J., Gulikers, J.T.M., P. & Brok, D. (2021). We agree on what we see: Teacher and student perceptions of formative assessment practice. *Studies in Educational Evaluation*. 70, 101027-14. <https://doi.org/10.1016/j.stueduc.2021.101027>
- Walter, M., Geerts., Henderien, W. S., & Paul, L. C. v. G. (2018). Assessing situated knowledge. *International Journal of Education and Practice*. 6,(3),134-146. <https://doi.org/10.18488/journal.61.2018.63.134.146>
- Wiethe-Korprich, M., & Sandra, B. (2017). Prospective educators as consumers of empirical research: an authentic assessment approach to make their competencies visible. *Empirical Res Voc Ed Train* 9,(8),2-26. <https://doi.org/10.1186/s40461->

AUTHENTIC ASSESSMENT DEVELOPMENT SCIENCE TO ASSESS STUDENT COMPETENCY

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ABSTRACT

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Keywords

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Contribution/Originality: The original of this study is an science authentic assessment (SAS) of quality compared to the performance assessment of previous studies

This study aims to: to find authentic models of science assessment in assessing the competence of senior high school students who meet the criteria: validity, practically, effectiveness. The model used is the development of a general educational development of Plomp and the theory of quality material (product) Nieveen. The result of the development of science assessment authentic (SAS) models meet the following criteria quality, the learning outcomes of students in the category of high, a positive student response. Model of SAS is very worthy science applied in teaching science for assessing the competence of senior high school students.

1. INTRODUCTION

Teachers, and learning process.. They view that the curriculum is first assessment: something continuous, interrelated all happening at the same time, and both strongly influence each other as, assessment process as an integral part of learning.

Paper and pencil tests are the only evaluation tools carried out in learning so that all student competencies cannot be measured (Kurniawatia & Sukardiyono, 2018; Mohamed & Lebar, 2017; Mongkuo & Mongkuo, 2017; Susani, 2018; Suwartono & Riyani, 2019; Alhouli & Al-Khayatt, 2020). While authentic assessment can measure all student competencies (Moria et al., 2017; Setyawarno & Kurniawati, 2018; Inayah et al., 2019; Salirawati, 2021)

2. THEORETICAL FRAMEWORK

2.1. Authentic Assessments

Complex situations authentic (Centoni & Antonello, 2021; Moria et al., 2017; Salirawati, 2021; Suarimbawa et al., 2017; Sutarto & Jaedun, 2018; Wiethe-Korprich & Sandra, 2017) Authentic assessment of educational achievement directly measures actual performance in the subject area (Fynn & Elias, 2022; Sholihah, 2021; Sutarto & Jaedun, 2018) picture students have show students is obtained (Aiken, 2013). In general examples of techniques authentic assessments are shown in Table 1.

Table 1. Techniques authentic assessments

Students can demonstrate that activity involves complex skills that are difficult to be assessed through paper and pencil tests.	
Plan and carry out experiments	Creating graph data
Writing stories, essays, poetry	Creating the chart
Give oral reports	Noting the observations
Being a peer tutor	Asking question
Creating of Journal	Improvise
interviewing informants	Creating computer programs
Being in a local travel guide	Searching for information in the library and etc
Correspond with authors science	Completing the literature review

Note: Organizing authentic assessments as in Figure 1 (Carin, 2017) and (Agus & Suprianti, 2017)

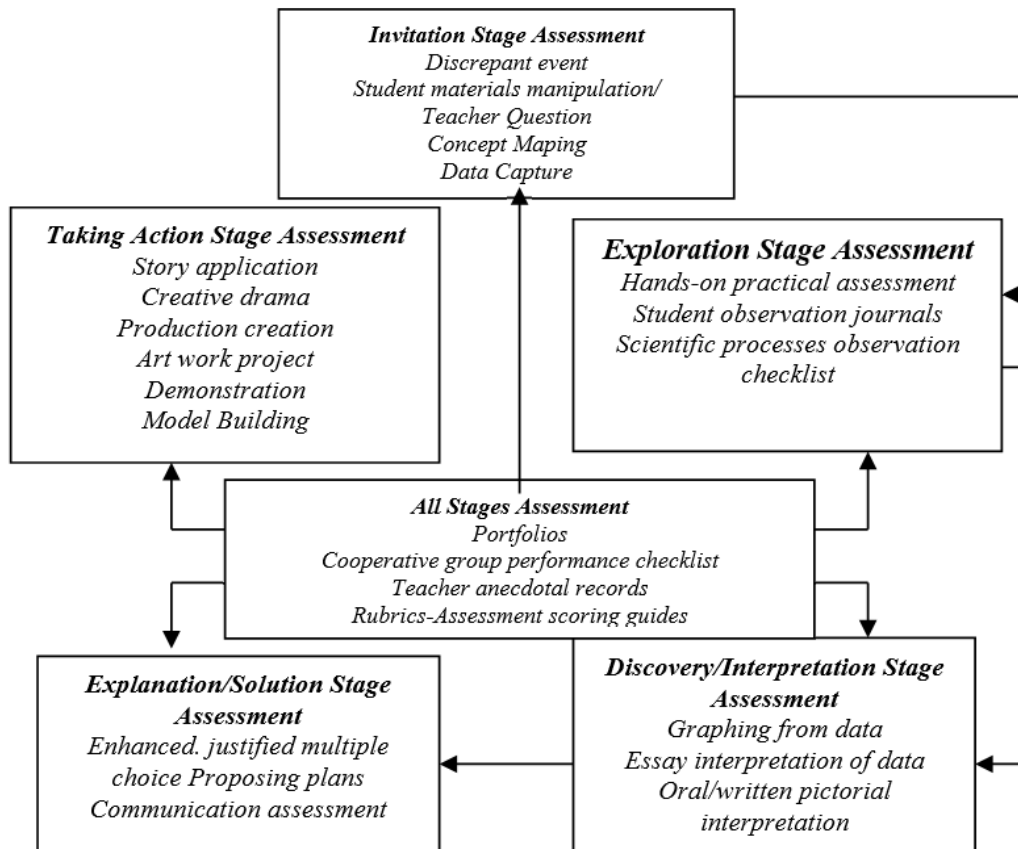


Figure 1. Authentic assessments organization in the learning cycle stage.

2.2. Implementation of Authentic Assessment

Implementation of authentic assessment at each stage can be described briefly (Kurniawati & Sukardiyono, 2018).

5. Invitational stage

Authentic assessments aimed to obtain information about the initial understanding of the students on a particular topic or concept. The technique can be used, among others, asking questions orally or in writing teacher-oriented to provoke students' opinions, presenting photos or illustrations that demonstrate a process or a particular situation.

6. Exploration stage

At this stage, the assessment aims to explore the ability of science process skills in students. Assessment used may be hands-on/minds-on activity includes the assessment of student activities and student observation journal.

7. Explanation stage

Authentic assessment done on the competence of students in observation, analysis, and communication.

8. Actions stage

At this stage, the assessment aims to uncover the student's ability to apply his understanding of a concept in other situations. The resulting product can be student demonstrations, role playing, oral or written communications, handicrafts, and others.

3. METHOD

3.1. Types of Research

This research includes developmental research. The development of authentic assessment models or SAS models and instruments required. The development of research-oriented products SAS models qualified in the aspect of validity, practically, and effectiveness.

3.2. Research Sites

This research was conducted in senior high school Sungguminasa in accordance with the needs of the development of science authentic assessment (SAS) models.

3.3. Participants

The subjects were students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. Number of research subjects in the test phase as many as 30 students.

3.4. Development Operational

Operational development of authentic models of science assessment [Figure 2](#).

Operationally the development of SAS models done simultaneously, so that when the validity of the model SAS criteria have not been met, then when revising the devices (partially or completely) done simultaneously revise SAS models support device and related instruments. Suppose revisions subject matter, it is done simultaneously revisions to the plan of teaching, and performance assessment tasks and rubrics.

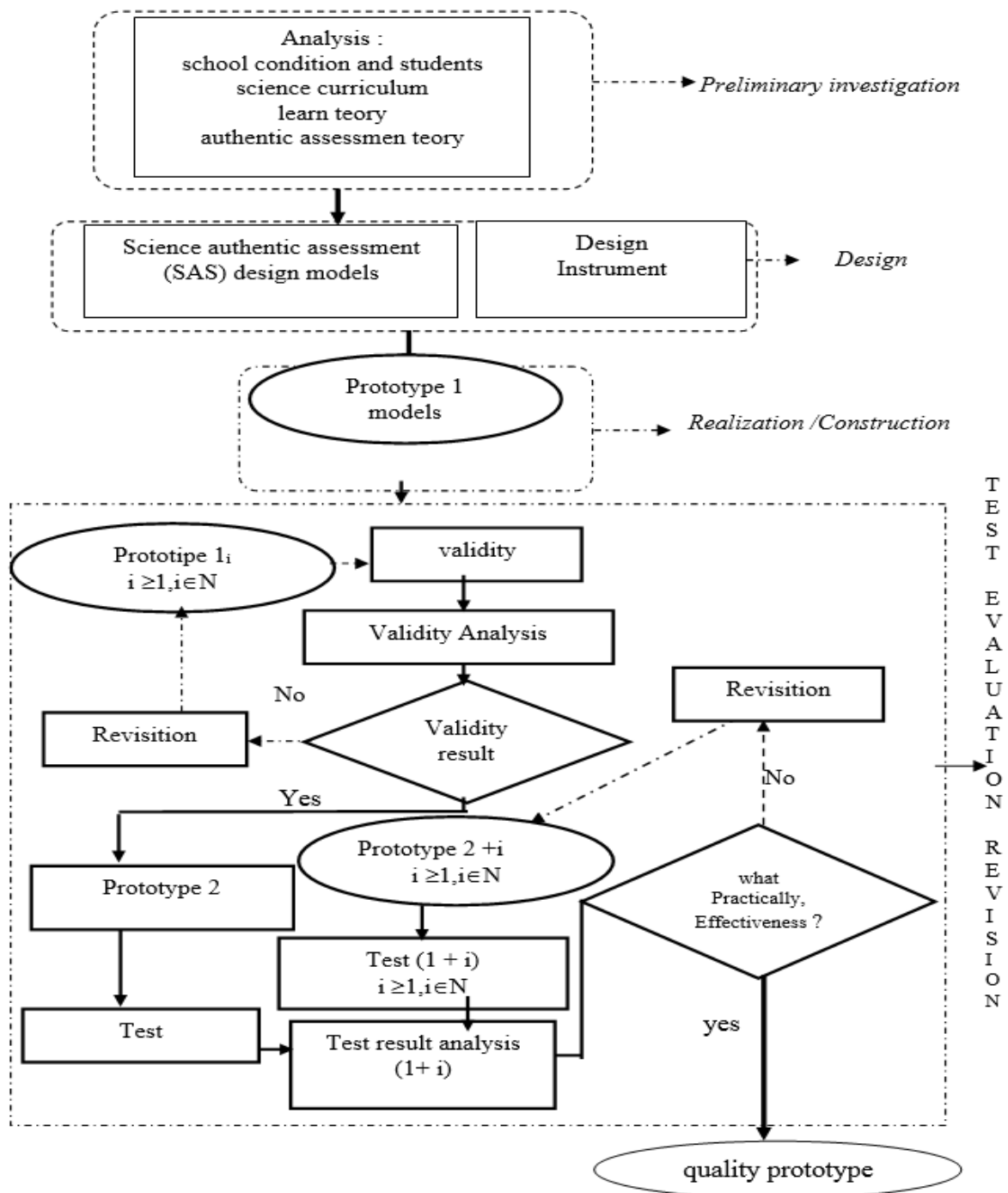


Figure 2. Development operational SAS models.

- Remarks :
- : Aktiviti Process
 - ◇ : Requirement results
 - ⋯ : Development operational
 - : Main flow
 - : Aktiviti results
 - - - : Needs if syclus process

3.5. Instrument

Instruments consisted of (1) SAS models validation sheet; (2) science achievement test; (3) questionnaire; and 4) the observation sheet. Instrument is validated by five experts associated with the evaluation and validation of the content of the construct validation. The tests showed that these instruments eligible for use in research.

3.6. Data Analysis

Data validity analysis, practicality, and effectiveness analysis using the theory Neveen (Huizinga et al., 2014) and (Veugen et al., 2021) in Table 2.

Table 2. Material quality.

Quality Aspects		
Validity	Practicality	Effectiveness
Intended (idea+ Formal :	Consistency between	Consistency between
-State of the art knowledge	-Intended ↔ Perceived	Intended ↔ Experiential
-Internally consistent	- Intended ↔ Operational	Intended ↔ Attained

Criteria for the categorization of quality SAS models using criteria by Bloom, (Fauzan et al., 2017) . with the following steps.

- d. Calculate average results of the validation of formula $k_i = \frac{\sum_{j=1}^n V_{ji}}{n}$ with k_i = average, the results

- e. Calculate average of formula $A_i = \frac{\sum_{j=1}^n k_{ij}}{n}$

k_{ij} : average sub-aspke i to j

n : the number aspect sub-aspects of the aspects of the i-th

- f. Calculate for a mean total (VR) with the formula $VR = \frac{\sum_{i=1}^n A_i}{n}$,

Table 3. SAS models validity criteria (Chakraborty et al., 2021).

Score Interval	Validity Criteria
$4 \leq VR \leq 5$	Very High
$3 \leq VR < 4$	High
$2 \leq VR < 3$	Less
$1 \leq VR < 2$	Low

Note: VR is the average total of the results of the assessment of experts, practitioners, and observers

A data analysis and the students' response to the implementation of the supporting components of SAS models and data from questionnaires to determine the A positive response, meaning that students support, feel happy, interested in the components and the learning process through the implementation of SAS models. A negative response otherwise. To determine the achievement of the objectives of the activity implementation of SAS models in terms of the students' responses, when the the number of studied.

This is the degree of achievement of competence is the percentage of student mastery of the content and performance of the basic competencies of 80% of the basic competencies that have been set can be achieved, (Wong et al., 2022).

States, a program of teaching and learning activities otherwise very effective, if to reach benchmark reference value set beforehand. Because the matter refers to the indicators, the values obtained by the students representing the student's mastery of the indicator is represented by the question, so that the control indicators can be expressed as the total value obtained by the students.

The criteria stated mastery learning with application of SAS models are a minimum score 80 (the maximum is 100). Interval score determining the level of student mastery (LSM) categorized (Wong et al., 2022).

Table 4. Criteria for level students'. Mastery (LSM)

Interval Scor	Category
$90 \leq LSM \leq 100$	Very high
$80 \leq LSM < 90$	high
$70 \leq LSM < 80$	less
$60 \leq LSM < 70$	low
$0 \leq LSM < 60$	Very low

Note: LSM is the average of the results of the level of student mastery of experts, and practitioners

4. RESULT

4.1. Environmental Needs Analysis

Based on the results of the response to 350 parents, about the implementation of the assessment Science in schools found that almost all parents want their information on the progress of the learning progress sisiwa from time to time and comprehensively, namely the development in cognitive, affective, and psychomotor aspects. This trend indicates that the marking system "paper and pencil test" (written test) conducted in schools during this time should be time takes a form of alternative assessment as a complementary system of written test. It is very urgent to do given that written tests can not assess all students' abilities, on the other hand people have a tendency to get information about the three aspects. This is in accordance with the opinion of (Svidzinskaya et al., 2019) and (Miller-Young et al., 2021) which states that by applying the assessment, the student's attitude competence can be measured

The assessment system that can address the needs of this community one of them is a model of SAS, it is quite reasonable, therefore, SAS models is one kind of assessment that has a philosophy of continuous assessment. The philosophy states that people eat to get the picture on the profile of the students, then of course the student should be photographed from all sides, not only in terms of cognitive, but affective, and psychomotor aspects need to be considered. These three aspects of this ability is absolutely developed simultaneously, as required in the curriculum of 2013.

On the results of this survey also found the information interesting to observe. First, in general, people wish that the assessment criteria used in the school to be communicated to students. It means that the assessment criteria used in assessing performance results (assignments, papers, daily tests) in school it was time delivered to students. Second, the public generally believes that students need to be included in assessing performance outcomes, it means that the community is aware of their students need to be trained assess themselves against the results of its performance. Therefore with trainer this ability, the students will be able to determine the "weakness" and "strength" has, so that in the end the students can have the ability to overcome the problems faced in everyday life. This is in accordance with the opinion of (Alhouli & Al-Khayati, 2020) and Syaifuddin (2020) which states that by applying the assessment, student skill competencies can be measured

The public need information about the assessment criteria can be answered by applying SAS models, because in this SAS model of the assessment criteria for every aspect of the student's performance has been set and similarly about self assessment. In the model of SAS students assess themselves, both self-assessment and assessment of the results of their performance themselves against participation in the group. Assessment of student' performance results in SAS models, teachers and students both of them provided a score for performance results.

The results of survey studies the response of parents as one of the elements in the community, it can be said that people's needs is in accordance with the benefits rather than the model SAS, namely by applying the SAS models in the school, the parents/guardians of students able to: (1) identify the weaknesses and strengths students in learning. This can be achieved, because each performance results achieved by students, the parents make comments/response to the achievements of the son/daughter. Parents have the opportunity to provide motivation and expression of expectations to be achieved; (2) determine kind of guidance to be done by the parents of students for achievement son/daughter, and (3) improvement of communication with the school in educating students.

The questionnaire results of five teachers of science in senior high school Sungguminasa, obtained information that in general teachers do not do the "feedback" to the results of performance (tasks, daily tests, and repeat the semester) their students, sometimes giving information on the assessment criteria, and never give a chance to students to assess themselves against the results of its performance. It means that there is a gap between the needs of the community with the implementation of the system of assessment in schools. Society nowadays need information how the learning progress of students in the school from time to time and in a comprehensive manner, the criteria used in the assessment, and trained students assess themselves, on the other hand it turns out these needs are not fully met.

The survey results mentioned above, this information reinforces the need to develop SAS models questionnaire results from 350 students showed that the suitability of the information contained on the teacher and the information from students, and students in general have a tendency to know the progress of learning results. It means that all the results of student performance over time needs to be informed, so that students can find out how their learning progress. The survey results of laboratory equipment, it still needed some laboratory equipment to support the implementation of SAS models. Laboratory equipment needed are: (1) tools calorimeter; (2) technical balance tool, and (3) expansion tool agent. The equipment is borrowed from physics laboratory, State University of Makassar. This can be realized because of the cooperation between the senior high school Sungguminasa and the University of Makassar. While the means of tables, benches, and laboratory equipments to support the implementation of SAS models. Therefore the form of tables, rectangular practicum students then setting the seating positions facing each other in the student made scientific activities (activities observing and experimenting). From the survey result means seating and tables that show the ingredients lab strongly supports the implementation of SAS models.

4.2. Analysis Curriculum

4.2.1. Analysis Front End

SAS model development is done to enhance the assessment system in cooperative learning and assessment models Hibbard. In the cooperative learning, assessment component is still some weaknesses. The weaknesses include more emphasis on the assessment of learning outcomes achieved by students at the end of the lesson and less emphasis on assessment of student performance results. To complement these weaknesses SAS models then developed a model based on the model assessment Hibbard. However, on the model of Hibbard's assessment there are still some weaknesses that need to be improved, including the absence of a self assessment against the group and there is no element of motivating both teachers and parents/guardians of students. On the other hand, this element is one element that is needed by the community in accordance with the results of surveys that have been described previously.

SAS models development is needed grounding theories were strong and intertwined between the theory and other theories. Based on the results of the literature review obtained several theories that support the development of models of SAS include: (1) understand cognitive; (2) understand constructivist: learning theory Piaget, learning theory Vygotsky, learning theory Bruner, learning theory Polya; (3) learning theory Ausebel; (4) Malmivuori learning theory; (5) theory class assessment: Herman, Ascbacher, and Winter, (6) theory class assessment Webb; (7) the theory of authentic assessment. According to his assessment of education experts and scientific experts who becomes validator in this study stated that these theories are very powerful and interlinked between the theory and other theories. These theories are very eligible as supporting theory in the development of SAS models.

4.2.2. Analysis of Students

The results of the initial analysis of the ability of mastering the concept of temperature and heat of 371 students, obtained information that many concepts of temperature and heat are not yet mastered by the student. It is shown from the results of the initial test material temperature and heat, the average score was only 4.85. There are only two classes who gets an average score above six. Based on this information, the concepts are not yet mastered by the student still needs to be given to the student book.

Students in participating in the implementation of SAS models are divided into groups, each group consisted of five students. In this group division is based on ability, gender, and type of parts. Information about the ability, gender, and type of tribal students obtained from the survey results. The data obtained from the student's ability documentation data Certificate of Examination Results. On the distribution of group members based on the theory of the division of Lie groups. The group division based on gender, and type of parts it is possible to do, because based on the data from the survey found that the ratio between the number of female students and male almost as many, nor about the type of clan (Bugis and Makassar tribe).

In this study, in addition to the information level of student ability, gender, and ethnicity are also needed information on the work of parents. The data about the job of parents is needed, because in the implementation of SAS models include aspects of the comments of parents on student achievement that has been accomplished. Based on the survey results, the work of parents/guardians support the implementation of SAS models, because in general the parents/guardians of students have a higher education. It means that all parents/guardians of students able to provide comments / feedback on the performance of their child.

The questionnaire results from 350 students, obtained information that the desire of the parents/guardians of students and students themselves have the same tendency, which both require assessment of learning outcomes of physics in schools is done from time to time and thoroughly (cognitive, affective, and psychomotor), the need for "feedback" immediately, and the assessment criteria used by teachers need to be delivered to students.

4.2.3. Analysis Material

In the analysis phase begins with the material provides the initial test to 390 students. Initial test material is the material temperature and the heat that has been studied by students. This initial test aims to determine the concepts of temperature and heat. Which has not been mastered by the students as a prerequisite to the concepts of temperature and heat the material. Results from this information, as a basis model of SAS software development by incorporating these concepts into their teaching.

Based on the results of this initial test, there are some concepts and understanding of the material and the temperature of heat required to be disclosed in the students' books. Concepts that still need to be "suppression" in the implementation of SAS models are: (1) the concept of temperature; (2) comparative scale thermometer, thermometer function concept, and the concept of the type of liquid in a thermometer; (3) the concept of water anomaly; (4) The heat unit concept, the concept of heat transfer; (5) the concept of specific heat, and the heat capacity; (6) the sense heat of evaporation, condensation understanding, and understanding the melting heat.

The results of the analysis of the structure of the content that was developed based on the contents of Curriculum 2013, in particular temperature and heat the material, it was found that the 2013 science curriculum senior high school is no longer the elaboration of indicators. It means that teachers are required to

create indicators and specific learning objectives. Based on this information, it is in the development of learning tools described pembelajaran indicators and objectives specific to each Lesson Plan, and in each of the learning plan comes with authentic assessment sheet.

The task analysis was conducted to identify the stages of completion of tasks in accordance with the temperature of the material and heat. Analysis of these tasks include the analysis of the content and concept analysis. The final result of the analysis contained in the task of "student 'performance, and authentic assessment sheet).

The results of observations of two observers on the ability of the students in the psychomotor aspects included in the high category with average yield of psychomotor abilities of 91. Similarly, the tasks implemented on SAS models, in the form of task performance which consists of duty to report the results of observations or experiments, in general, students do well, it can be seen from the result of the ability of process skills which the average value of students reached 81 on the pilot phase of 90, the task doing the competency test in general students can do, it can be seen from the average results study on cognitive aspects in pilot phase 90. the task of the students assess themselves against the results of self-assessment of its performance and its participation in the group also generally do well, as seen in the learning outcomes in the affective aspects of 82 on the pilot phase of 90, and when analyzed data from observations of two observers show that all students are engaged in class discussions, conduct cooperation in scientific activities, ask the same friends and teachers, provide ideas. Similarly, data from the questionnaire results in the affective aspect of learning outcomes showed that the results were consistent with the observations and the results of the students' statements within the SAS models, all of which showed average values above 80. It was proved that the learning outcomes of students in a very affective aspects reliable. That is, there is a match between the observer and the statement of the results of a respondent. While the selection task, and the task of reflection also on the subject matter students are generally well done, but the results rather than the student's performance is not analyzed further, because the results of the performance of these tasks is the result of group work done at home. However, that does not mean it has no effect on the motivation of the students, because the value of the group is taken as a reference in awarding the prize to the group. This scenario is delivered to students, so that they are motivated to do the work of the group, both in completing observation or experiment, and perform tasks in the home.

The results of the analysis of the information indicates that some of the concepts of temperature and heat that previously have not been mastered by students based on the results of the initial tests (material temperature and heat in Junior high school) at the time participated in the implementation of the model SAS these concepts can already be controlled, which is reflected in the value of the average learning results obtained during the implementation of SAS models by 79 in the test phase at 90. While the average initial test results only 40.

The results obtained from the analysis of the concept of teacher responses indicate that 100 percent of teachers said that the analysis of this concept is very helpful in implementing SAS models. It means that the analysis of the concept is practically implemented in SAS models.

4.3. SAS Models Validation Results

Data content includes the validation results supporting theories SAS models development and validation constructs include constructs linkages between components of SAS models in the category of valid and fit for use. The results of the validation content and construct models of the SAS in [Table 5 and 6](#).

Table 5. Data of validity results module science authentic assessment content

No	Rated aspect	The Average aspect Ai
1.	Supporting theory model of science authentic assessment	4.1
2.	Step-by-step implementation model of science authentic assessment	3.9
3.	The social system in the implementation model of science authentic assessment	3.9
4.	The principle of the model management reaction science authentic assessment	4.0
5.	SAS models support system implementation	3.9
6.	Impact of the implementation and impact of the model companion science authentic assessment	4.0
7.	Implementation of the model of science authentic assessment	4.1
8.	The learning environment and management duties science authentic assessment models	3.8
9.	science authentic assessment models evaluation	3.9
	The average total (VR) = 3.9	

Note: Ai is the average of the results of validity module science authentic assessment content

4.4. Expert Commentary

Rate In general expert states that the theories that support the development of authentic assessment science is very solid and intertwined among the theories described in SAS models. The suggestions of the expert of which is in the handbook and supplements SAS models should be made more compact (without reducing essential things) that have high readability and acceptability. All devices are generally decent SAS models used in the field for data retrieval research. Revisions to the book model of SAS on the criteria for assessment of the results of scientific activity, namely criteria: create questions, formulate problems, make hypotheses, create tables, create graphics, reading charts, making predictions, designing experiments (formulate variable manipulation, response variables, control variables, manipulation variable definition, the definition of control variables) and make inferences.

Table 6. Data of validity results construct components science authentic assessment model.

No	Rate Aspects	The Average aspects Ai
1.	science authentic assessment model components	3.9
2.	science authentic assessment models support the theory	4.1
3.	Step-by-step implementation of science authentic assessment models	3.8
4.	The social system in the implementation of science authentic assessment models	3.8
5.	Reaction principle management science authentic assessment models	3.9
6.	science authentic assessment models	3.8
7.	the implementation Bridesmaids science authentic assessment models	3.6
8.	Implementation of science authentic assessment models	4.1
9.	The learning environment and management duties models science authentic assessment	3.7
10.	science authentic assessment model evaluation	4.3
	The average total (VR) = 4.2	

Note: Ai is the average of the results of validity construct components science authentic assessment model

4.5. Expert Commentary

In general, states that the link expert contents of the components of SAS models are interrelated and do not find any contradiction between what the contents of the book with the device SAS models. Comments and suggestions from the expert including SAS models guidebook packed with modern learning theory is very relevant to the central theme of research. The handbook should be made more compact, attractive and avoid some mistakes topography. Data validation results SAS model development support device consisting of [Table 6](#): planning for learning; [Table 7](#): task authentic assessment; [Table 8](#): result validity assessment authentic supplement, [Table 9](#): guidelines for teachers; [Table 10](#): guidelines for students, and [Table 11](#): book of students all supporting devices in the category of valid and fit for use.

Table 7. Lesson planning data validity results.

No.	Rate Aspects	The Average aspects Ai
1	Indicator	3.9
2	The contents of the subject matter	4.0
3	Language	3.8
4	Time	3.9
5	Teaching methods	3.7
6	Learning Closed	3.9
	Average Total (VR) = 3.8	

Note: Ai is the average of the results of validity Lesson planning

Table 8. Date of validity result student' activity sheet.

No	Rate Aspects	The Average aspects Ai
1	Organisation	4.0
2	Prosedure	3.7
3	Question/Problem	3.7
	Average Total (VR) = 3.9	

Note: Ai is the average of the results of validity student' activity sheet

Table 9. Date of validity result authentic assessment suplement.

No.	Rate Aspects	The Average aspects Ai
1	Organisation	3.9
2	Prosedure	3.9
3	Question/Problem	3.9
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity authentic assessment suplement

Table 10. Data of validity results teacher manual.

No	Rate Aspects	The Average aspects Ai
1.	Introduction	3.9
2.	Science probelem representation	4.2
3.	Learning method	3.8
4.	Learning closed	3.9
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity teacher manual

Science achievement test consisting of a test product, scientific knowledge tests, and performance tests at tested to 43 students. The test consists of 24 items of products, after testing produced 23 items that valid and an invalid item. The tests show that the contents of the item 23 to be able to represent all the material temperature and heat with the level of reliability 0.99. Scientific knowledge test consists of 23 items, after testing produced 23, is 0.99. The performance test of 10 items, after testing produced is 0.72.

4.6. Effectiveness of Models SAS

[Table 11](#) shows the results of teacher feedback on the effectiveness of the implementation of SAS models. The teachers in assessing the effectiveness of using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

Table 11. Data of validaty results student manual.

No	Rate Aspects	The Average aspects Ai
1	Sub organization concept	3.6
2	Translation of troubleshooting steps temperature and heat	3.9
3	Activity	4.4
4	Learning closed	4.2
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity student manual

Table 12. Data validaty results student book.

No	Rate Aspects	The Average aspects Ai
1	Translation of material	3.9
2	Construction	3.9
3	Exercise	4.0
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity student book

Table 13. Data of effectiveness science authentic assessment models.

No	Rate Aspects	The Average aspects Ai
1	Student learning outcomes	4.1
2	Student Response Against Components and Implementation Process science authentic assessment models	4.1
Average Total (VR) = 4.1		

Note: Ai is the average of the results of effectiveness science authentic assessment models

4.7. Practicality of Models SAS

[Table 14](#), shows the practicality of the model based on the observation SAS with implementation SAS models support device.

Table 14. Data on implementation of supporting device for science authentic assessment model.

No	Rate Aspects	The Average aspects Ai
1	Measures Implementation of science authentic assessment models	3.1
2	Social Systems Implementation of science authentic assessment models	3.9
3	Reaction Principle Management science authentic assessment models	3.8
IO Value or Value Average Total (VR) = 3.6		

Note: Ai is the average of the results of implementation of supporting device for science authentic assessment model

Remarks:

IO is intended \Leftrightarrow O Perational

Science achievement test scores found that the level of student mastery (LSM) of the subject matter of science high 90 and 100 percent of students completed. Students' response to the implementation of science authentic assessment models is a slight positive, according to the teacher's response to the ease of implementing science authentic assessment models is positive.

Table 13 following several students comment on questions related to the implementation of SAS models support device.

3. Are you able to understand the language used in the book Student, Student Worksheet, Student Manual, and supplements science authentic assessment?
4. Are you interested in the appearance (text, large font, image, layout images, colors) books Student, Student Worksheet, Student Manual, and supplements science authentic assessment?

Table 15. Data of comments student questionnaire response to the question on of science authentic assessment

No.	Comment	
	First question	The second question
1	Yes, because all of a language that is very easy to understand	Yes, because in the book student, student worksheet, student manual, and supplements science authentic assessment already written clearly accompanied by images that can allow me to learn.
2	Yes, the explanation of the book student, student worksheet, student manual, and supplements science authentic assessment easy to understand and clear explanation	Yes, because the appearance of such a book students, student worksheet, student manual, and supplements science authentic assessment students will be more interested in reading and with their images with easy to understand explanations.
3	Yes, because the language used is the language and its standard sentence too short and clear so easy to understand.	Yes, because with the article with pictures easier for students to understand the intent rather than the text.
4	Yes, I can understand the language used in the book student, student worksheet, student manual, and supplements science authentic assessment	Yes, because if the appearance of text, large font, image, layout and color pictures in books student, student worksheet, student manual, and supplements science authentic assessment, the learning atmosphere we will tdak boring and happy doing his work.

Table 16, shows the results of the responses of six education experts regarding enforceability of SAS models theoretically in the field. Educational experts in assessing the enforceability of SAS models in the classroom by using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

Table 16. Expert response data regarding the implementation of science authentic assessment model.

No	Aspects Observed and Judged	Average aspect Ai
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation model of science authentic assessment	4.2
3	Principle reaction models management science authentic assessment	4.3
Average Total = 4.2		

Note: Ai is the average of the results of expert responses regarding the implementation of science authentic assessment model

[Table 17](#), enforceability of data models in a class derived from the observation of two (2) people watchers. Observers in observing the implementation of SAS models during seven meetings using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high; 5 is very high.

Table 17. Observation result data on the implementation of the science authentic assessment models.

No	Aspects Observed and Judged	Average aspect Ai
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation models of science authentic assessment	4.3
3	Principle reaction models management science authentic assessment	4.2
Average Total = 4.2		

Note: Ai is the average of the results of observation on the implementation of science authentic assessment model

Ratings among experts on the implementation of SAS models is theoretically consistent with the observation observer SAS model implementation in the classroom 4.2 it indicates that that the application of SAS models in practical classes.

5. DISCUSSION AND CONCLUSION

5.1. Discussion

The analysis of the validity and practicality found that SAS models support device is valid criteria and practical criteria applied in assessing student competence. Student competency can be assessed in a comprehensive and sustainable. [Muho & Taraj \(2022\)](#) found that formative assessment practices affect students' motivation in learning English.

Student learning outcomes include cognitive aspects (products and processes), affective, and psychomotor aspects obtained from the authentic supplement the assessment indicates that results for students in the pilot phase already meets the standards of competence specified achievement. This is caused because all the planning done well. Similarly, the results obtained from the student learning achievement test at the end of the implementation of the model. This means that the device is SAS models meet the criteria effectiveness. ([Chi et al., 2021](#)) conducted a study related to comparing student science, found for participants.

Results of student and teacher responses to the components and implementation of SAS models show a positive response. It shows that in the aspect of student and teacher responses to the components and implementation of SAS models meet the criteria of effectiveness. That is, the entire device is SAS models support the implementation of learning in the classroom is expected that students will be more motivated to learn science.

Based on the results of this questionnaire are generally teachers found the necessary and feasible SAS models developed on the subject of how to do more with the device making training and accompanied by the provision of laboratory equipment in accordance with the required media in the implementation of the SAS models. Similarly, the teacher stated that the strategy of implementation of SAS models can be used as a primary strategy in learning science. ([Vahidnia et al., 2021](#)) and ([Fauzan et al., 2013](#)) also developed and validated an instrument of student attitudes towards teachers to find differences in the level of student attitudes

Both results are very appropriate response to the comments of experts based on their knowledge and experience theoretically. It proved empirically SAS model implementation in the field which is derived from the observation of two (2) observers indicate that the average yield assessment scores of both observers in the high category and reliable. Thus, it can be said that the implementation of SAS models is theoretically supported by empirical data in the field with high reliability. That is, the implementation of SAS models although observed by different people and different conditions will give consistent results. [Toma \(2021\)](#) developed Instrument and psychometric evaluation

Teachers initially still faces obstacles in implementing SAS models, it is because, as a model system SAS is a form of assessment and learning system innovation. As it like an innovation, then the SAS models requires a shift in perspective from teachers, the community, including a shift in perspective parents. Changing the way it is not an easy task, but requires hard work and commitment. Teachers are required to be able to pay attention to individual students, monitor progress, encourage them more activity, collecting every student work to be comments, and so forth. All it requires extra time and effort. Therefore, teachers lack strong motivation in their profession, it would be difficult to implement this SAS models. The difference between this study and that developed by ([Chi et al., 2021](#)) and ([Matsumoto-Royo & Ramirez-Montoya, 2021](#)), and ([Wong et al., 2022](#)), is only Instrument Knowledge development.

In the next phase, the teachers have been able to overcome the obstacles perceived in the early stages. Teachers, giving students the opportunity to assess themselves to the task with a friend based on the guidelines asesment autgentic. Teachers keep checking on the results of this self-assessment. The impact than self assessment is that it will foster honesty of students in doing the job. SAS Models has some weaknesses in

the implementation of the class are: (1) due to the limitations of the researcher, only two observers to observe social skills, psychomotor skills of students, and enforceability of SAS models. This is done with the consideration that if the use of many observers, it can affect the process of implementation of SAS models in the classroom; (2) observation of social skills, and psychomotor skills performed in all groups. This is done with the consideration that social skills and psychomotor skills a person can not be sampled for other people. All information to assess social skills and psychomotor skills, then observations were made only one group at each meeting. Since a lot of meetings in the implementation of SAS models as much as seven meetings either at trial. The disadvantage of this observation is the observation frequency becomes a little bit, but the excess all students accessed.

5.2. Conclusion

Conclusions of this study resulted in SAS models qualified products meet the criteria of validity; practicality and effectiveness. The results of students in the high category and the response of students and teachers on the implementation of positive SAS models. This is in accordance with the opinion of (Wiethe-Korprich & Sandra 2017) and (Toma, 2021; Suwartono & Riyani, 2019), which states that by applying the assessment, students' knowledge competence can be measured (Setyawarno & Kurniawati, 2018) and (Sutarto & Jaedun, 2018).

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REFERENCES

- Agus, K., & Suprianti, G.A.P. (2017). An Analysis of Authentic Assessment Implementation Based on Curriculum 2013 in SMP Negeri 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Aiken, L. R. (2013). *Psychological tests and evaluation*. Mexico: Pearson.
- Alhouli, A. I., & Al-Khayatt, A. K. A. (2020). Assessing the soft skills needs of teacher education students. *International Journal of Education and Practice*, 8(3), 416-431. Available at: <https://doi.org/10.18488/journal.61.2020.83.416.431>.
- Carin, A. A. (2017). *Teaching Science Through Discovery* (eight ed). New Jersey: Prentice Hall, Inc. https://www.google.co.id/books/edition/Teaching_Science
- Centoni, M., & Antonello, M. (2021). Students' evaluation of academic courses: An exploratory analysis to an Italian case study. *Studies in Educational Evaluation*, 70, 101054. Available at: <https://doi.org/10.1016/j.stueduc.2021.101054>.
- Chakraborty, S., Dann, C., Mandal, A., Dann, B., & Paul, M. (2021). Effects of rubric quality on marker variation in higher education. *Studies in Educational Evaluation*, 70, 100997. Available at: <https://doi.org/10.1016/j.stueduc.2021.100997>.
- Chi, S., Xiu, F. L., & Zuhao, W. (2021). Comparing student science performance between hands-on and traditional item types: A many-facet Rasch analysis. *Studies in Educational Evaluation*, 70, 100998. Available at: <https://doi.org/10.1016/j.stueduc.2021.100998>.
- Fauzan, A., Plomp, T., & Gravemeijer, K. (2013). The development of an rme-based geometry course for Indonesia primary schools. *Education Design Research-Part B: Illustrative Cases*, 159-178. <https://pure.tue.nl/ws/files/3900348/23590380570408.pdf>
- Fynn, A., & Elias, O. M. (2022). Continuous online assessment at a South African open distance and e-learning institution. *Frontiers in Education Original Research*, 27(79), 1-13. Available at: <https://doi.org/10.3389/educ.2022.791271>.
- Huizinga, T., Handelzalts, A., Nieveen, N., & Voogt, J. M. (2014). Teacher involvement in curriculum design: Need for support to enhance teachers' design expertise. *Journal of Curriculum Studies*, 46(1), 33-57. Available at: <https://doi.org/10.1080/00220272.2013.834077>.
- Inayah, N., Komariah, E., & Nasir, A. (2019). The practice of authentic assessment in an EFL speaking classroom. *Studies in English Language and Education*, 6(1), 152-162. Available at: <https://doi.org/10.24815/siele.v6i1.13069>.
- Kurniawati, A., & Sukardiyono, S. (2018). The development of authentic assessment instrument to measure science process skill and achievement based on students' performance. *Journal of Physics Education Research & Development*, 4(2), 65-74. Available at: <https://doi.org/10.21009/1.04203>.
- Matsumoto-Royo, K., & Ramírez-Montoya, S. M. (2021). Core practices in practice-based teacher education: A systematic literature review of its teaching and assessment process. *Studies in Educational Evaluation*, 70, 101047. Available at: <https://doi.org/10.1016/j.stueduc.2021.101047>.
- Miller-Young, J., Marin, L. F., Poth, C., Vargas-Madriz, L. F., & Xiao, J. (2021). The development and psychometric properties of an educational development impact questionnaire. *Studies in Educational Evaluation*, 70, 101058. Available at: <https://doi.org/10.1016/j.stueduc.2021.101058>.
- Mohamed, R., & Lebar, O. (2017). Authentic assessment in assessing higher order thinking skills. *International Journal of Academic Research in Business and Social Sciences*, 7(2), 466-476. <https://doi.org/10.6007/IJARBS/v7-i2/2021>

- Mongkuo, M. Y., & Mongkuo, M. Y. (2017). Testing the factorial equivalence of the collegiate learning assessment performance task diagnostic instrument across lower class and upper class predominantly black college students. *International Journal of Education and Practice*, 5(6), 95-103. Available at: <https://doi.org/10.18488/Journal.61.2017.56.95.103>.
- Moria, E., Refnaldi, R., & Zaim, M. (2017). *Using authentic assessment to better facilitate teaching and learning: The case for students' writing assessment*. Paper presented at the Sixth International Conference on Languages and Arts (ICLA 2017). Atlantis Press. <https://doi.org/10.2991/icla-17.2018.57>
- Muho, A., & Taraj, G. (2022). Impact of formative assessment practices on student motivation for learning the English language. *International Journal of Education and Practice*, 10(1), 25-41. Available at: <https://doi.org/10.18488/61.v10i1.2842>.
- Salirawati, D. (2021). Authentic assessment in the pandemic period. *Journal of The Indonesian Society of Integrated Chemistry*, 13(1), 21-31. <https://doi.org/10.22437/jisic.v13i1.11716>
- Setyawarno, D., & Kurniawati, A. (2018). Implementation of Authentic Assessment in Science Learning at Indonesian Schools. *Journal of Science Education Research*, 2(2), 47-55. <https://journal.uny.ac.id/index.php/jser/article/view/22468/pdf>
- Sholihah, M. (2021). Authentic assessment in online learning during the covid-19 pandemic. *Edunesia: Scientific Journal of Education*, 2(2), 576-580. <https://doi.org/10.51276/edu.v2i2.167>
- Suarimbawa, K. A., Marhaeni, A., & Suprianti, G. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. Available at: <https://doi.org/10.23887/jere.v1i1.9551>.
- Susani, R. (2018). The implementation of authentic assessment in extensive reading. *International Journal of Education*, 11(1), 87-92. <https://www.learntechlib.org/p/208935/>.
- Sutarto, H. P., & Jaedun, M. P. D. (2018). Authentic assessment competence of building construction teachers in Indonesian vocational schools. *Journal of Technical Education and Training*, 10(1). <https://10.30880/jtet.2018.10.01.008>
- Suwartono, T., & Riyani, C. (2019). Authentic assessment in ELT: Hopes, challenges, and practices. *Reflection on Education: Scientific Journal of Education*, 9(2). <https://doi.org/10.24176/re.v9i2.2865>
- Svidzinskaya, G. B., Baskin, Y. G., & Mezentseva, M. E. e. (2019). Using the Semantic Differential Method to Assess the Learning Motivation and Attitude of First-Year Students towards Chemistry in University of EMERCOM of Russia. *International Journal of Education and Practice*, 7(2), 88-100. <https://doi.org/10.18488/journal.61.2019.72.88.100>
- Syaifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*, 9(4), 1491-1502. Available at: <https://doi.org/10.12973/eu-er.9.4.1491>.
- Toma, B. R. (2021). Measuring children's perceived cost of school science: Instrument development and psychometric evaluation. *Studies in Educational Evaluation*, 70, 101009. <https://doi.org/10.1016/j.stueduc.2021.101009>
- Vahidnia, F., Behzad, G. H., & Hesamoddin, S. (2021). Development and validation of students' attitudes towards teacher's pet phenomenon scale in the higher education setting: Differences by levels of study and grade-point-average. *Studies in Educational Evaluation*, 70, 101000. Available at: <https://doi.org/10.1016/j.stueduc.2021.101000>.
- Veugen, M. J., Gulikers, J. T. M., P., & Brok, D. (2021). We agree on what we see: Teacher and student perceptions of formative assessment practice. *Studies in Educational Evaluation*, 70, 101027. Available at: <https://doi.org/10.1016/j.stueduc.2021.101027>.
- Wiethe-Korprich, M., & Sandra, B. (2017). Prospective educators as consumers of empirical research: An authentic assessment approach to make their competencies visible. *Empirical Research in Vocational Education and Training*, 9(8), 2-26. Available at: <https://doi.org/10.1186/s40461>.
- Wong, K. K., Bajwa, T., & Fienup, D. M. (2022). The application of mastery criterion to individual operants and the effects on acquisition and maintenance of responses. *Journal of Behavioral Education*, 31(3), 461-483. <https://doi.org/10.1007/s10864-020-09420-3>

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Kristina, W. K., Bajwa, T., & Fienup, D. M. (2021). The application of mastery criterion to individual operants and the effects on acquisition and maintenance of responses. *Journal of Behavioral Education*, 1-23.

Sutarto, H. P., & Jaedun, M. P. D. (2018). Authentic assessment competence of building construction teachers in Indonesian vocational schools. *Journal of Technical Education and Training*, 10(1).

Suwartono, T., & Riyani, C. (2019). Authentic assessment in ELT: Hopes, challenges, and practices. *Reflection on Education: Scientific Journal of Education*, 9(2).

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AUTHENTIC ASSESSMENT DEVELOPMENT SCIENCE TO ASSESS STUDENT COMPETENCY

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ABSTRACT

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Keywords

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This study aims to: to find authentic models of science assessment in assessing the competence of senior high school students who meet the criteria: validity, practicality, effectiveness. The model used is the development of a general educational development of Plomp and the theory of quality material (product) Nieveen. The result of the development of authentic science assessment (SAS) models meets the following criteria for quality, the learning outcomes of students in the category of high, a positive student response. The SAS model is very worthy of applied science in teaching science for assessing the competence of senior high school students.

Contribution/Originality: The original of this research is the authentic science assessment model (SAS) which was found in this research validity, practicality, effectiveness which no one has yet found this kind of assessment model

1. INTRODUCTION

Teachers, and learning process.. They view that the curriculum is first assessment: something continuous, interrelated all happening at the same time, and both strongly influence each other as, assessment process as an integral part of learning.

Paper and pencil tests are the only evaluation tools carried out in learning so that all student competencies cannot be measured (Al Houli & Al-Khayatt, 2020; Kurniawati & Sukardiyono, 2018; Mohamed & Lebar, 2017; Mongkuo & Mongkuo, 2017; Susani, 2018; Suwartono & Riyani, 2019). While authentic assessment can measure all student competencies (Inayah, Komariah, & Nasir, 2019; Moria, Refnaldi, & Zaim, 2017; Setyawarno & Kurniawati, 2018).

2. THEORETICAL FRAMEWORK

2.1. Authentic Assessments

Complex situations authentica (Centoni & Antonello, 2021; Moria et al., 2017; Salirawati, 2021; Suarimbawa, Marhaeni, & Suprianti, 2017; Sutarto & Jaedun, 2018; Wiethe-Korprich & Sandra, 2017)

Authentic assessment of educational achievement directly measures actual performance in the subject area (Fynn & Elias, 2022; Sholihah, 2021; Sutarto & Jaedun, 2018) picture students have show students is obtained (Aiken, 2013). In general examples of techniques authentic assessments are shown in [Table 1](#).

Table 1. Techniques authentic assessments.

Students can demonstrate that activity involves complex skills that are difficult to be assessed through paper and pencil tests.	
Plan and carry out experiments	Creating graph data
Writing stories, essays, poetry	Creating the chart
Give oral reports	Noting the observations
Being a peer tutor	Asking question
Creating of Journal	Improvise
interviewing informants	Creating computer programs
Being in a local travel guide	Searching for information in the library and etc
Correspond with authors science	Completing the literature review

Organizing authentic assessments as in [Figure 1](#) Carin (2017) and Agus and Suprianti (2017).

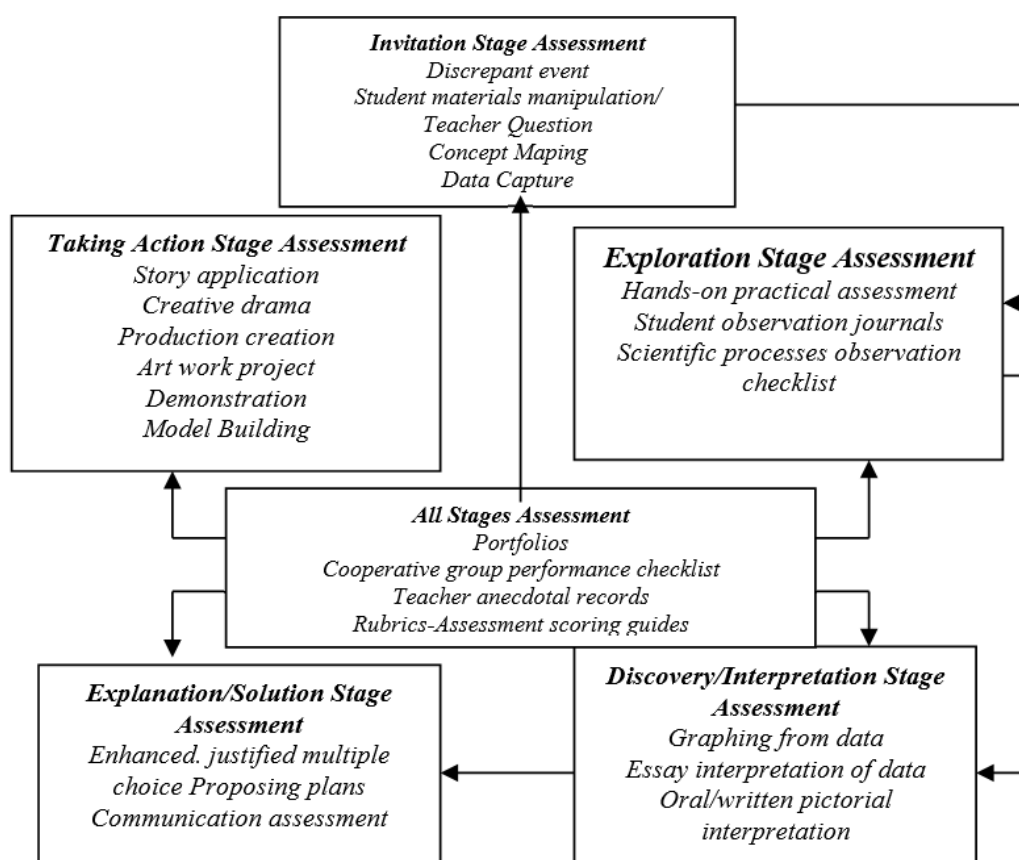


Figure 1. Authentic assessments organization in the learning cycle stage.

2.2. Implementation of Authentic Assessment

Implementation of authentic assessment at each stage can be described briefly (Kurniawati & Sukardiyono, 2018).

9. Invitational stage

Authentic assessments aimed to obtain information about the initial understanding of the students on a particular topic or concept. The technique can be used, among others, asking questions orally or in writing teacher-oriented to provoke students' opinions, presenting photos or illustrations that demonstrate a process or a particular situation.

10. Exploration stage

At this stage, the assessment aims to explore the ability of science process skills in students. Assessment used may be hands-on/minds-on activity includes the assessment of student activities and student observation journal.

11. *Explanation stage*

Authentic assessment done on the competence of students in observation, analysis, and communication.

12. *Actions stage*

At this stage, the assessment aims to uncover the student's ability to apply his understanding of a concept in other situations. The resulting product can be student demonstrations, role playing, oral or written communications, handicrafts, and others.

3. METHOD

3.1. Types of Research

This research includes developmental research. The development of authentic assessment models or SAS models and instruments required. The development of research-oriented products SAS models qualified in the aspect of validity, practically, and effectiveness.

3.2. Research Sites

This research was conducted in senior high school Sungguminasa in accordance with the needs of the development of science authentic assessment (SAS) models.

3.3. Participants

The subjects were students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. Number of research subjects in the test phase as many as 30 students.

3.4. Development Operational

Operational development of authentic models of science assessment [Figure 2](#).

Operationally the development of SAS models done simultaneously, so that when the validity of the model SAS criteria have not been met, then when revising the devices (partially or completely) done simultaneously revise SAS models support device and related instruments. Suppose revisions subject matter, it is done simultaneously revisions to the plan of teaching, and performance assessment tasks and rubrics.

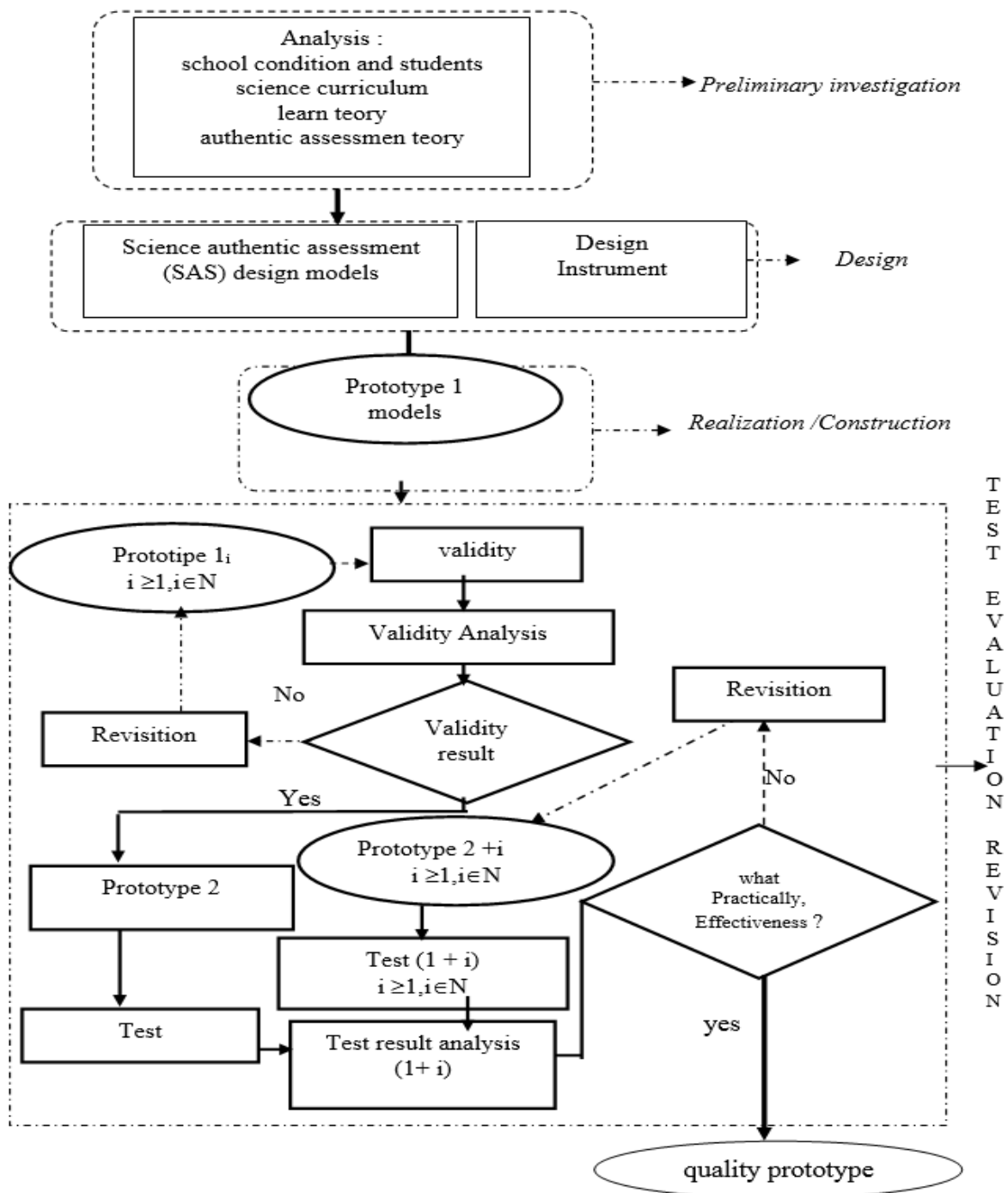


Figure 2. Development operational SAS models.

Remarks :

- : Aktivty Process
- ◇ : Requirement results
- ⋯ : Development operational
- : Main flow
- : Aktivty results
- - - → : Needs if syclus process

3.5. Instrument

Instruments consisted of (1) SAS models validation sheet; (2) science achievement test; (3) questionnaire; and 4) the observation sheet. Instrument is validated by five experts associated with the evaluation and validation of the content of the construct validation. The tests showed that these instruments eligible for use in research.

3.6.Data Analysis

Data validity analysis, practicality, and effectiveness analysis using the theory Neveen(Huizinga, Handelzalts, Nieveen, & Voogt, 2014) and Veugen, Gulikers, and Brok (2021)in [Table 2](#).

Table 2. Material quality.

Quality Aspects		
Validity	Practicality	Effectiveness
Intended (idea+ Formal :	Consistency between	Consistency between
-State of the art knowledge	-Intended ↔ Perceived	Intended ↔ Experiential
-Internally consistent	- Intended ↔ Operational	Intended ↔ Attained

Criteria for the categorization of quality SAS models using criteria by Bloom,(Fauzan, Plomp, & Gravemeijer, 2013) with the following steps.

g. Calculate average results of the validation of formula $k_i = \frac{\sum_{j=1}^n V_{ji}}{n}$ with k_i = average, the results

h. Calculate average of formula $A_i = \frac{\sum_{j=1}^n k_{ij}}{n}$

k_{ij} : average sub-aspkei to j

n : the number aspect sub-aspects of the aspects of the i-th

i. Calculate for a mean total (VR) with the formula $VR = \frac{\sum_{i=1}^n A_i}{n}$,

[Table 3](#) presents the Validity of the SAS model(Chakraborty, Dann, Mandal, Dann, & Paul, 2021).

Table 3. Validity of the SAS model(Chakraborty, Dann, Mandal, Dann, & Paul, 2021).

ScorInterval	Validity Criteria
4 ≤ VR ≤ 5	Very High
3 ≤ VR < 4	High
2 ≤ VR < 3	Less
1 ≤ VR < 2	Low

Note: VR is the average total of the results of the assessment of experts, practitioners, and observers.

Adata analysis and the students' response to the implementation of the supporting components of SAS models and data from questionnaires to determine the A positive response, meaning that students support, feel happy, interested in the components and the learning process through the implementation of SAS models. A negative response otherwise. To determine the achievement of the objectives of the activity implementation of SAS models in terms of the students' responses, when the the number of studied.

This is the degree of achievement of competence is the percentage of student mastery of the content and performance of the basic competencies of 80% of the basic competencies that have been set can be achieved(Wong, Bajwa, & Fienup, 2022).States, a program of teaching and learning activities otherwise very effective, if to reach benchmark reference value set beforehand. Because the matter refers to the indicators, the values obtained by the students representing the student's mastery of the indicator is represented by the question, so that the control indicators can be expressed as the total value obtained by the students.

The criteriastated mastery learning with application of SAS models are a minimum score 80 (the maximum is 100). Interval score determining the level of student mastery (LSM) categorized(Wong et al., 2022).

[Table 4](#) presents Criteria forlevelstudents'mastery (LSM).

Table 4.Criteria forlevel students'mastery (LSM).

IntervalScor	Category
90 ≤ LSM ≤ 100	Very high
80 ≤ LSM < 90	high
70 ≤ LSM < 80	less
60 ≤ LSM < 70	low
0 ≤ LSM < 60	Very low

Note:LSM is the average of the results of the level of student mastery of experts, and practitioners.

4. RESULT

4.1. Environmental Needs Analysis

Based on the results of the response to 350 parents, about the implementation of the assessment Science in schools found that almost all parents want their information on the progress of the learning progress sisiwa from time to time and comprehensively, namely the development in cognitive, affective, and psychomotor aspects. This trend indicates that the marking system "paper and pencil test" (written test) conducted in schools during this time should be time takes a form of alternative assessment as a complementary system of written test. It is very urgent to do given that written tests can not assess all students' abilities, on the other hand people have a tendency to get information about the three aspects. This is in accordance with the opinion of [Svidzinskaya, Baskin, and Mezentseva \(2019\)](#) and [Miller-Young, Marin, Poth, Vargas-Madriz, and Xiao \(2021\)](#) which states that by applying the assessment, the student's attitude competence can be measured

The assessment system that can address the needs of this community one of them is a model of SAS, it is quite reasonable, therefore, SAS models is one kind of assessment that has a philosophy of continuous assessment. The philosophy states that people eat to get the picture on the profile of the students, then of course the student should be photographed from all sides, not only in terms of cognitive, but affective, and psychomotor aspects need to be considered. These three aspects of this ability is absolutely developed simultaneously, as required in the curriculum of 2013.

On the results of this survey also found the information interesting to observe. First, in general, people wish that the assessment criteria used in the school to be communicated to students. It means that the assessment criteria used in assessing performance results (assignments, papers, daily tests) in school it was time delivered to students. Second, the public generally believes that students need to be included in assessing performance outcomes, it means that the community is aware of their students need to be trained assess themselves against the results of its performance. Therefore with trainer this ability, the students will be able to determine the "weakness" and "strength" has, so that in the end the students can have the ability to overcome the problems faced in everyday life. This is in accordance with the opinion of [AlHouli and Al-Khayatt \(2020\)](#) and [Syaifuddin \(2020\)](#) which states that by applying the assessment, student skill competencies can be measured

The public need information about the assessment criteria can be answered by applying SAS models, because in this SAS model of the assessment criteria for every aspect of the student's performance has been set and similarly about self assessment. In the model of SAS students assess themselves, both self-assessment and assessment of the results of their performance themselves against participation in the group. Assessment of student' performance results in SAS models, teachers and students both of them provided a score for performance results.

The results of survey studies the response of parents as one of the elements in the community, it can be said that people's needs is in accordance with the benefits rather than the model SAS, namely by applying the SAS models in the school, the parents/guardians of students able to: (1) identify the weaknesses and strengths students in learning. This can be achieved, because each performance results achieved by students, the parents make comments/response to the achievements of the son/daughter. Parents have the opportunity to provide motivation and expression of expectations to be achieved; (2) determine kind of guidance to be done by the parents of students for achievement son/daughter, and (3) improvement of communication with the school in educating students.

The questionnaire results of five teachers of science in senior high school Sungguminasa, obtained information that in general teachers do not do the "feedback" to the results of performance (tasks, daily tests, and repeat the semester) their students, sometimes giving information on the assessment criteria, and never give a chance to students to assess themselves against the results of its performance. It means that there is a gap between the needs of the community with the implementation of the system of assessment in schools. Society nowadays need information how the learning progress of students in the school from time to time and in a comprehensive manner, the criteria used in the assessment, and trained students assess themselves, on the other hand it turns out these needs are not fully met.

The survey results mentioned above, this information reinforces the need to develop SAS models questionnaire results from 350 students showed that the suitability of the information contained on the teacher and the information from students, and students in general have a tendency to know the progress of learning results. It means that all the results of student performance over time needs to be informed, so that students can find out how their learning progress. The survey results of laboratory equipment, it still needed some laboratory equipment to support the implementation of SAS models. Laboratory equipment needed are: (1) tools calorimeter; (2) technical balance tool, and (3) expansion tool agent. The equipment is borrowed from physics laboratory, State University of Makassar. This can be realized because of the cooperation between the senior high school Sungguminasa and the University of Makassar. While the means of tables, benches, and laboratory equipments to support the implementation of SAS models. Therefore the form of tables, rectangular practicum students then setting the seating positions facing each other in the student made

scientific activities (activities observing and experimenting). From the survey result means seating and tables that show the ingredients lab strongly supports the implementation of SAS models.

4.2. Analysis Curriculum

4.2.1. Analysis Front End

SAS model development is done to enhance the assessment system in cooperative learning and assessment models Hibbard. In the cooperative learning, assessment component is still some weaknesses. The weaknesses include more emphasis on the assessment of learning outcomes achieved by students at the end of the lesson and less emphasis on assessment of student performance results. To complement these weaknesses SAS models then developed a model based on the model assessmen Hibbard. However, on the model of Hibbard's assessment there are still some weaknesses that need to be improved, including the absence of a self assessment against the group and there is no element of motivating both teachers and parents/guardians of students. On the other hand, this element is one element that is needed by the community in accordance with the results of surveys that have been described previously.

SAS models development is needed grounding theories were strong and intertwined between the theory and other theories. Based on the results of the literature review obtained several theories that support the development of models of SAS include: (1) understand cognitive;(2) understand constructivist: learning theory Piaget, learning theory Vygotsky, learning theory Bruner, learning theory Polya;(3) learning theory Ausebel;(4) Malmivuori learning theory;(5) theory class assessment: Herman, Ascbacher, and Winter, (6) theory class assessment Webb;(7) the theory of authentic assessment. According to his assessment of education experts and scientific experts who becomes validator in this study stated that these theories are very powerful and interlinked between the theory and other theories. These theories are very eligible as supporting theory in the development of SAS models.

4.2.2. Analysis of Students

The results of the initial analysis of the ability of mastering the concept of temperature and heat of 371 students, obtained information that many concepts of temperature and heat are not yet mastered by the student. It is shown from the results of the initial test material temperature and heat, the average score was only 4.85. There are only two classes who gets an average score above six. Based on this information, the concepts are not yet mastered by the student still needs to be given to the student book.

Students in participating in the implementation of SAS models are divided into groups, each group consisted offivestudents. In this group division is based on ability, gender, and type of parts. Information about the ability, gender, and type of tribal students obtained from the survey results. The data obtained from the student's ability documentation data Certificate of Examination Results. On the distribution of group members based on the theory of the division of Lie groups. The group division based on gender, and type of parts it is possible to do, because based on the data from the survey found that the ratio between the number of female students and male almost as many, nor about the type of clan (Bugis and Makassar tribe).

In this study, in addition to the information level of student ability, gender, and ethnicity are also needed information on the work of parents. The data about the job of parents is needed, because in the implementation of SAS models include aspects of the comments of parents on student achievement that has been accomplished. Based on the survey results, the work of parents/guardians support the implementation of SAS models, because in general the parents/guardians of students have a higher education. It means that all parents/guardians of students able to provide comments / feedback on the performance of their child.

The questionnaire results from 350 students, obtained information that the desire of the parents/guardians of students and students themselves have the same tendency, which both require assessment of learning outcomes of physics in schools is done from time to time and thoroughly (cognitive, affective, and psychomotor), the need for "feedback" immediately, and the assessment criteria used by teachers need to be delivered to students.

4.2.3. Analysis Material

In the analysis phase begins with the material provides the initial test to 390 students. Initial test material is the material temperature and the heat that has been studied by students. This initial test aims to determine the concepts of temperature and heat. Which has not been mastered by the students as a prerequisite to the concepts of temperature and heat the material. Results from this information, as a basis model of SAS software development by incorporating these concepts into their teaching.

Based on the results of this initial test, there are some concepts and understanding of the material and the temperature of heat required to be disclosed in the students' books. Concepts that still need to be "suppression" in the implementation of SAS models are: (1) the concept of temperature; (2) comparative scale thermometer, thermometer function concept, and the concept of the type of liquid in a thermometer; (3) the concept of water anomaly; (4) The heat unit concept, the concept of heat transfer; (5) the concept of specific heat, and the heat capacity; (6) the sense heat of evaporation, condensation understanding, and understanding the melting heat.

The results of the analysis of the structure of the content that was developed based on the contents of Curriculum 2013, in particular temperature and heat the material, it was found that the 2013 science curriculum senior high school is no longer the elaboration of indicators. It means that teachers are required to create indicators and specific learning objectives. Based on this information, it is in the development of learning tools described pembelajaran indicators and objectives specific to each Lesson Plan, and in each of the learning plan comes with authentic assessment sheet. The task analysis was conducted to identify the stages of completion of tasks in accordance with the temperature of the material and heat. Analysis of these tasks include the analysis of the content and concept analysis. The final result of the analysis contained in the task of "student 'performance, and authentic assessment sheet). The results of observations of two observers on the ability of the students in the psychomotor aspects included in the high category with average yield of psychomotor abilities of 91. Similarly, the tasks implemented on SAS models, in the form of task performance which consists of duty to report the results of observations or experiments, in general, students do well, it can be seen from the result of the ability of process skills which the average value of students reached 81 on the pilot phase of 90, the task doing the competency test in general students can do, it can be seen from the average results study on cognitive aspects in pilot phase 90. the task of the students assess themselves against the results of self-assessment of its performance and its participation in the group also generally do well, as seen in the learning outcomes in the affective aspects of 82 on the pilot phase of 90, and when analyzed data from observations of two observers show that all students are engaged in class discussions, conduct cooperation in scientific activities, ask the same friends and teachers, provide ideas. Similarly, data from the questionnaire results in the affective aspect of learning outcomes showed that the results were consistent with the observations and the results of the students' statements within the SAS models, all of which showed average values above 80. It was proved that the learning outcomes of students in a very affective aspects reliable. That is, there is a match between the observer and the statement of the results of a respondent. While the selection task, and the task of reflection also on the subject matter students are generally well done, but the results rather than the student's performance is not analyzed further, because the results of the performance of these tasks is the result of group work done at home. However, that does not mean it has no effect on the motivation of the students, because the value of the group is taken as a reference in awarding the prize to the group. This scenario is delivered to students, so that they are motivated to do the work of the group, both in completing observation or experiment, and perform tasks in the home. The results of the analysis of the information indicates that some of the concepts of temperature and heat that previously have not been mastered by students based on the results of the initial tests (material temperature and heat in Junior high school) at the time participated in the implementation of the model SAS these concepts can already be controlled, which is reflected in the value of the average learning results obtained during the implementation of SAS models by 79 in the test phase at 90. While the average initial test results only 40.

The results obtained from the analysis of the concept of teacher responses indicate that 100 percent of teachers said that the analysis of this concept is very helpful in implementing SAS models. It means that the analysis of the concept is practically implemented in SAS models.

4.3. SAS Models Validation Results

Data content includes the validation results supporting theories SAS models development and validation constructs include constructs linkages between components of SAS models in the category of valid and fit for use. The results of the validation content and construct models of the SAS in [Table 5 and 6](#).

Table 5. Data of validity results module science authentic assessment content.

No	Rated aspect	The Average aspect Ai
1.	Supporting theory model of science authentic assessment	4.1
2.	Step-by-step implementation model of science authentic assessment	3.9
3.	The social system in the implementation model of science authentic assessment	3.9
4.	The principle of the model management reaction science authentic assessment	4.0
5.	SAS models support system implementation	3.9
6.	Impact of the implementation and impact of the model companion science authentic assessment	4.0
7.	Implementation of the model of science authentic assessment	4.1
8.	The learning environment and management duties science authentic assessment models	3.8
9.	science authentic assessment models evaluation	3.9
	The average total (VR) = 3.9	

Note: Ai is the average of the results of validity module science authentic assessment content.

4.4. Expert Commentary

Rate In general expert states that the theories that support the development of authentic assessment science is very solid and intertwined among the theories described in SAS models. The suggestions of the expert of which is in the handbook and supplements SAS models should be made more compact (without reducing essential things) that have high readability and acceptability. All devices are generally decent SAS models used in the field for data retrieval research. Revisions to the book model of SAS on the criteria for assessment of the results of scientific activity, namely criteria: create questions, formulate problems, make hypotheses, create tables, create graphics, reading charts, making predictions, designing experiments (formulate variable manipulation, response variables, control variables, manipulation variable definition, the definition of control variables) and make inferences.

Table 6. Data of validity results construct components science authentic assessment model.

No	Rate Aspects	The Average aspects Ai
1.	science authentic assessment model components	3.9
2.	science authentic assessment models support the theory	4.1
3.	Step-by-step implementation of science authentic assessment models	3.8
4.	The social system in the implementation of science authentic assessment models	3.8
5.	Reaction principle management science authentic assessment models	3.9
6.	science authentic assessment models	3.8
7.	the implementation Bridesmaids science authentic assessment models	3.6
8.	Implementation of science authentic assessment models	4.1
9.	The learning environment and management duties models science authentic assessment	3.7
10.	science authentic assessment model evaluation	4.3
	The average total (VR) = 4.2	

Note: Ai is the average of the results of validity construct components science authentic assessment model.

4.5. Expert Commentary

In general, states that the link expert contents of the components of SAS models are interrelated and do not find any contradiction between what the contents of the book with the device SAS models. Comments and suggestions from the expert including SAS models guidebook packed with modern learning theory is very relevant to the central theme of research. The handbook should be made more compact, attractive and avoid some mistakes topography. Data validation results SAS model development support device consisting of [Table 6](#): planning for learning; [Table 7](#): task authentic assessment; [Table 8](#): result validity assessment authentic supplement, [Table 9](#): guidelines for teachers; [Table 10](#): guidelines for students, and [Table 11](#): book of students all supporting devices in the category of valid and fit for use.

Table 7. Lesson planning data validity results.

No.	Rate Aspects	The Average aspects Ai
1	Indicator	3.9
2	The contents of the subject matter	4.0
3	Language	3.8
4	Time	3.9
5	Teaching methods	3.7
6	Learning Closed	3.9
	Average Total (VR) = 3.8	

Note: Ai is the average of the results of validity Lesson planning.

Table 8. Date of validity result student' activity sheet.

No	Rate Aspects	The Average aspects Ai
1	Organisation	4.0
2	Prosedure	3.7
3	Question/Problem	3.7
	Average Total (VR) = 3.9	

Note: Ai is the average of the results of validity student' activity sheet.

Table 9. Date of validity result authentic assessment suplement.

No.	Rate Aspects	The Average aspects Ai
1	Organisation	3.9
2	Prosedure	3.9
3	Question/Problem	3.9
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity authentic assessment suplement.

Table 10. Data of validity results teacher manual.

No	Rate Aspects	The Average aspects Ai
1.	Introduction	3.9
2.	Science probelem representation	4.2
3.	Learning method	3.8
4.	Learning closed	3.9
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity teacher manual.

Science achievement test consisting of a test product, scientific knowledge tests, and performance tests at tested to 43 students. The test consists of 24 items of products, after testing produced 23 items that valid and an invalid item. The tests show that the contents of the item 23 to be able to represent all the material temperature and heat with the level of reliability 0.99. Scientific knowledge test consists of 23 items, after testing produced 23, is 0.99. The performance test of 10 items, after testing produced is 0.72.

4.6. Effectiveness of Models SAS

Table 11 shows the results of teacher feedback on the effectiveness of the implementation of SAS models. The teachers in assessing the effectiveness of using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

Table 12 presents Data validity results student book.

Table 11. Data of validity results student manual.

No	Rate Aspects	The Average aspects Ai
1	Sub organization concept	3.6
2	Translation of troubleshooting steps temperature and heat	3.9
3	Activity	4.4
4	Learning closed	4.2
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity student manual.

Table 12. Data validity results student book.

No	Rate Aspects	The Average aspects Ai
1	Translation of material	3.9
2	Construction	3.9
3	Exercise	4.0
Average Total (VR) = 3.9		

Note: Ai is the average of the results of validity student book.

Table 13. Data of effectiveness science authentic assessment models.

No	Rate Aspects	The Average aspects Ai
1	Student learning outcomes	4.1
2	Student Response Against Components and Implementation Process science authentic assessment models	4.1
Average Total (VR) = 4.1		

Note: Ai is the average of the results of effectiveness science authentic assessment models.

4.7. Practicality of Models SAS

Table 14, shows the practicality of the model based on the observation SAS with implementation SAS models support device.

Table 14. Data on implementation of supporting device for science authentic assessment model.

No	Rate Aspects	The Average aspects Ai
1	Measures Implementation of science authentic assessment models	3.1
2	Social Systems Implementation of science authentic assessment models	3.9
3	Reaction Principle Management science authentic assessment models	3.8
IO Value or Value Average Total (VR) = 3.6		

Note: Ai is the average of the results of implementation of supporting device for science authentic assessment model.

Remarks:

IO is *intended* ⇔ *Operational*

Science achievement test scores found that the level of student mastery (LSM) of the subject matter of science high 90 and 100 percent of students completed. Students' response to the implementation of science authentic assessment models is a slight positive, according to the teacher's response to the ease of implementing science authentic assessment models is positive.

Table 15. Data of comments student questionnaire response to the question on of science authentic assessment.

No.	Comment	
	First question	The second question
1	Yes, because all of a language that is very easy to understand	Yes, because in the book student, student worksheet, student manual, and supplements science authentic assessment already written clearly accompanied by images that can allow me to learn.
2	Yes, the explanation of the book student, student worksheet, student manual, and supplements science authentic assessment easy to understand and clear explanation	Yes, because the appearance of such a book students, student worksheet, student manual, and supplements science authentic assessment students will be more interested in reading and with their images with easy to understand explanations.
3	Yes, because the language used is the language and its standard sentence too short and clear so easy to understand.	Yes, because with the article with pictures easier for students to understand the intent rather than the text.
4	Yes, I can understand the language used in the book student, student worksheet, student manual, and supplements science authentic assessment	Yes, because if the appearance of text, large font, image, layout and color pictures in books student, student worksheet, student manual, and supplements science authentic assessment, the learning atmosphere we will not boring and happy doing his work.

Table 15 following several students comment on questions related to the implementation of SAS models support device.

- Are you able to understand the language used in the book Student, Student Worksheet, Student Manual, and supplements science authentic assessment?
- Are you interested in the appearance (text, large font, image, layout images, colors) books Student, Student Worksheet, Student Manual, and supplements science authentic assessment?

Table 16. Expert response data regarding the implementation of science authentic assessment model.

No	Aspects Observed and Judged	Average aspect Ai
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation model of science authentic assessment	4.2
3	Principle reaction models management science authentic assessment	4.3
Average Total = 4.2		

Note: Ai is the average of the results of expert responses regarding the implementation of science authentic assessment model.

Table 16, shows the results of the responses of six education experts regarding enforceability of SAS models theoretically in the field. Educational experts in assessing the enforceability of SAS models in the classroom by using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

Table 17. Observation result data on the implementation of the science authentic assessment models.

No	Aspects Observed and Judged	Average aspect A_i
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation models of science authentic assessment	4.3
3	Principle reaction models management science authentic assessment	4.2
Average Total = 4.2		

Note: A_i is the average of the results of observation on the implementation of science authentic assessment model.

Table 17, enforceability of data models in a class derived from the observation of two (2) people watchers. Observers in observing the implementation of SAS models during seven meetings using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high; 5 is very high.

Ratings among experts on the implementation of SAS models is theoretically consistent with the observation observer SAS model implementation in the classroom 4.2 it indicates that that the application of SAS models in practical classes.

5. DISCUSSION AND CONCLUSION

5.1. Discussion

The analysis of the validity and practicality found that SAS models support device is valid criteria and practical criteria applied in assessing student competence. Student competency can be assessed in a comprehensive and sustainable. Muho and Taraj (2022) found that formative assessment practices affect students' motivation in learning English.

Student learning outcomes include cognitive aspects (products and processes), affective, and psychomotor aspects obtained from the authentic supplement the assessment indicates that results for students in the pilot phase already meets the standards of competence specified achievement. This is caused because all the planning done well. Similarly, the results obtained from the student learning achievement test at the end of the implementation of the model. This means that the device is SAS models meet the criteria effectiveness. Chi, Xiu, and Zuhao (2021) conducted a study related to comparing student science, found for participants.

Results of student and teacher responses to the components and implementation of SAS models show a positive response. It shows that in the aspect of student and teacher responses to the components and implementation of SAS models meet the criteria of effectiveness. That is, the entire device is SAS models support the implementation of learning in the classroom is expected that students will be more motivated to learn science.

Based on the results of this questionnaire are generally teachers found the necessary and feasible SAS models developed on the subject of how to do more with the device making training and accompanied by the provision of laboratory equipment in accordance with the required media in the implementation of the SAS models. Similarly, the teacher stated that the strategy of implementation of SAS models can be used as a primary strategy in learning science. Vahidnia, Behzad, and Hesamoddin (2021) and Fauzan et al. (2013) also developed and validated an instrument of student attitudes towards teachers to find differences in the level of student attitudes

Both results are very appropriate response to the comments of experts based on their knowledge and experience theoretically. It proved empirically SAS model implementation in the field which is derived from the observation of two (2) observers indicate that the average yield assessment scores of both observers in the high category and reliable. Thus, it can be said that the implementation of SAS models is theoretically supported by empirical data in the field with high reliability. That is, the implementation of SAS models although observed by different people and different conditions will give consistent results. Toma (2021) developed Instrument and psychometric evaluation

Teachers initially still faces obstacles in implementing SAS models, it is because, as a model system SAS is a form of assessment and learning system innovation. As it like an innovation, then the SAS models requires a shift in perspective from teachers, the community, including a shift in perspective parents. Changing the way it is not an easy task, but requires hard work and commitment. Teachers are required to be able to pay attention to individual students, monitor progress, encourage them more activity, collecting every student work to be comments, and so forth. All it requires extra time and effort. Therefore, teachers lack strong motivation in their profession, it would be difficult to implement this SAS models. The difference between this study and that developed by Chi et al. (2021) and Matsumoto-Royo and Ramírez-Montoya (2021) and Wong et al. (2022) is only Instrument Knowledge development.

In the next phase, the teachers have been able to overcome the obstacles perceived in the early stages. Teachers, giving students the opportunity to assess themselves to the task with a friend based on the guidelines assessment authentic. Teachers keep checking on the results of this self-assessment. The impact than self assessment is that it will foster honesty of students in doing the job. SAS Models has some weaknesses in the implementation of the class are: (1) due to the limitations of the researcher, only two observers to observe social skills, psychomotor skills of students, and enforceability of SAS models. This is done with the consideration that if the use of many observers, it can affect the process of implementation of SAS models in the classroom; (2) observation of social skills, and psychomotor skills performed in all groups. This is done with the consideration that social skills and psychomotor skills a person can not be sampled for other people. All information to assess social skills and psychomotor skills, then observations were made only one group at each meeting. Since a lot of meetings in the implementation of SAS models as much as seven meetings either at trial. The disadvantage of this observation is the observation frequency becomes a little bit, but the excess all students accessed.

5.2. Conclusion

Conclusions of this study resulted in SAS models qualified products meet the criteria of validity; practicality and effectiveness. The results of students in the high category and the response of students and teachers on the implementation of positive SAS models. This is in accordance with the opinion of Wiethe-Korprich and Sandra (2017) and Toma (2021); Suwartono and Riyani (2019) which states that by applying the assessment, students' knowledge competence can be measured (Setyawarno & Kurniawati, 2018) and Sutarto and Jaedun (2018).

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REFERENCES

- Agus, K., & Suprianti, G. A. P. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. Available at: <https://doi.org/10.23887/jere.v1i1.9551>.
- Aiken, L. R. (2013). *Psychological tests and evaluation*. Mexico: Pearson.
- AlHouli, A. I., & Al-Khayatt, A. K. A. (2020). Assessing the soft skills needs of teacher education students. *International Journal of Education and Practice*, 8(3), 416-431. Available at: <https://doi.org/10.18488/journal.61.2020.83.416.431>.
- Carin, A. A. (2017). *Teaching science through discovery* (8th ed.). New Jersey: Prentice Hall.
- Centoni, M., & Antonello, M. (2021). Students' evaluation of academic courses: An exploratory analysis to an Italian case study. *Studies in Educational Evaluation*, 70, 101054. Available at: <https://doi.org/10.1016/j.stueduc.2021.101054>.
- Chakraborty, S., Dann, C., Mandal, A., Dann, B., & Paul, M. (2021). Effects of rubric quality on marker variation in higher education. *Studies in Educational Evaluation*, 70, 100997. Available at: <https://doi.org/10.1016/j.stueduc.2021.100997>.
- Chi, S., Xiu, F. L., & Zuhao, W. (2021). Comparing student science performance between hands-on and traditional item types: A many-facet Rasch analysis. *Studies in Educational Evaluation*, 70, 100998. Available at: <https://doi.org/10.1016/j.stueduc.2021.100998>.
- Fauzan, A., Plomp, T., & Gravemeijer, K. (2013). The development of an RME-based geometry course for Indonesian Primary schools. In T. Plomp, & N. Nieveen (Eds.), *Educational design research - Part B. Illustrative cases* (pp. 159-178). SLO: Netherlands Institute for Curriculum Development.
- Fynn, A., & Elias, O. M. (2022). Continuous online assessment at a South African open distance and e-learning institution. *Frontiers in Education Original Research*, 27(79), 1-13. Available at: <https://doi.org/10.3389/feduc.2022.791271>.
- Huizinga, T., Handelzalts, A., Nieveen, N., & Voogt, J. M. (2014). Teacher involvement in curriculum design: Need for support to enhance teachers' design expertise. *Journal of Curriculum Studies*, 46(1), 33-57. Available at: <https://doi.org/10.1080/00220272.2013.834077>.
- Inayah, N., Komariah, E., & Nasir, A. (2019). The practice of authentic assessment in an EFL speaking classroom. *Studies in English Language and Education*, 6(1), 152-162. Available at: <https://doi.org/10.24815/siele.v6i1.13069>.
- Kurniawati, A., & Sukardiyono, S. (2018). The development of authentic assessment instrument to measure science process skill and achievement based on students' performance. *Journal of Physics Education Research & Development*, 4(2), 65-74. Available at: <https://doi.org/10.21009/1.04203>.
- Matsumoto-Royo, K., & Ramírez-Montoya, S. M. (2021). Core practices in practice-based teacher education: A systematic literature review of its teaching and assessment process. *Studies in Educational Evaluation*, 70, 101047. Available at: <https://doi.org/10.1016/j.stueduc.2021.101047>.
- Miller-Young, J., Marin, L. F., Poth, C., Vargas-Madriz, L. F., & Xiao, J. (2021). The development and psychometric properties of an educational development impact questionnaire. *Studies in Educational Evaluation*, 70, 101058. Available at: <https://doi.org/10.1016/j.stueduc.2021.101058>.

- Mohamed, R., & Lebar, O. (2017). Authentic assessment in assessing higher order thinking skills. *International Journal of Academic Research in Business and Social Sciences*, 7(2), 466-476.
- Mongkuo, M. Y., & Mongkuo, M. Y. (2017). Testing the factorial equivalence of the collegiate learning assessment performance task diagnostic instrument across lower class and upper class predominantly black college students. *International Journal of Education and Practice*, 5(6), 95-103. Available at: <https://doi.org/10.18488/Journal.61.2017.56.95.103>.
- Moria, E., Refinaldi, R., & Zaim, M. (2017). *Using authentic assessment to better facilitate teaching and learning: The case for students' writing assessment*. Paper presented at the Sixth International Conference on Languages and Arts (ICLA 2017). Atlantis Press.
- Muho, A., & Taraj, G. (2022). Impact of formative assessment practices on student motivation for learning the English language. *International Journal of Education and Practice*, 10(1), 25-41. Available at: <https://doi.org/10.18488/61.v10i1.2842>.
- Salirawati, D. (2021). Authentic assessment in the pandemic period. *Journal of The Indonesian Society of Integrated Chemistry*, 13(1), 21-31.
- Setyawarno, D., & Kurniawati, A. (2018). Implementation of authentic assessment in science learning at Indonesian schools. *Journal of Science Education Research*, 2(2), 47-55.
- Sholihah, M. (2021). Authentic assessment in online learning during the covid-19 pandemic. *Edunesia: Scientific Journal of Education*, 2(2), 576-580.
- Suarimbawa, K. A., Marhaeni, A., & Suprianti, G. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. Available at: <https://doi.org/10.23887/jere.v1i1.9551>.
- Susani, R. (2018). The implementation of authentic assessment in extensive reading. *International Journal of Education*, 11(1), 87-92.
- Sutarto, H. P., & Jaedun, M. P. D. (2018). Authentic assessment competence of building construction teachers in Indonesian vocational schools. *Journal of Technical Education and Training*, 10(1), 91-108.
- Suwartono, T., & Riyani, C. (2019). Authentic assessment in ELT: Hopes, challenges, and practices. *Reflection on Education: Scientific Journal of Education*, 9(2), 112-119.
- Svidzinskaya, G. B., Baskin, Y. G., & Mezentseva, M. E. e. (2019). Using the Semantic Differential Method to Assess the Learning Motivation and Attitude of First-Year Students towards Chemistry in University of EMERCOM of Russia. *International Journal of Education and Practice*, 7(2), 88-100.
- Syaifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*, 9(4), 1491-1502. Available at: <https://doi.org/10.12973/eu-er.9.4.1491>.
- Toma, B. R. (2021). Measuring children's perceived cost of school science: Instrument development and psychometric evaluation. *Studies in Educational Evaluation*, 70, 101009. Available at: <https://doi.org/10.1016/j.stueduc.2021.101009>.
- Vahidnia, F., Behzad, G. H., & Hesamoddin, S. (2021). Development and validation of students' attitudes towards teacher's pet phenomenon scale in the higher education setting: Differences by levels of study and grade-point-average. *Studies in Educational Evaluation*, 70, 101000. Available at: <https://doi.org/10.1016/j.stueduc.2021.101000>.
- Veugen, M. J., Gulikers, J. T. M., P., & Brok, D. (2021). We agree on what we see: Teacher and student perceptions of formative assessment practice. *Studies in Educational Evaluation*, 70, 101027. Available at: <https://doi.org/10.1016/j.stueduc.2021.101027>.
- Wiethe-Korprich, M., & Sandra, B. (2017). Prospective educators as consumers of empirical research: An authentic assessment approach to make their competencies visible. *Empirical Research in Vocational Education and Training*, 9(8), 2-26. Available at: <https://doi.org/10.1186/s40461>.
- Wong, K. K., Bajwa, T., & Fienup, D. M. (2022). The application of mastery criterion to individual operants and the effects on acquisition and maintenance of responses. *Journal of Behavioral Education*, 31(3), 461-483. Available at: <https://doi.org/10.1007/s10864-020-09420-3>.



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AUTHENTIC ASSESSMENT DEVELOPMENT SCIENCE TO ASSESS STUDENT COMPETENCY

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ABSTRACT

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Keywords

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This study aimed to examine authentic models of science assessment in assessing the competence of senior high school students who meet the criteria: validity, practicality, effectiveness. Plomp development model research design and Neeven product quality theory. The methodology applied is: approach: (1) preliminary investigation, (2) design, (3) realization/construction, (4) test evaluation revision, and (5) quality prototype. Types of Research, this research includes developmental research. Research Sites: this research was conducted in senior high school in accordance with the needs of the development of authentic science assessment (SAS) models. Participants: The subjects were students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. Implementation of Authentic Assessment: Invitational stage, exploration stage, explanation stage, actions stage. Number of research subjects in the test phase as many as 30 students Instruments composed of (1) SAS model validation sheet; (2) science achievement test; (3) questionnaires; and (4) the observation sheet. Data validity analysis descriptive. The findings of the quality authentic science assessment model meet the criteria for high category learning outcomes positive student responses. The practical implications of the SAS model are very worthy of applied science in teaching science for assessing the competence of senior high school students.

Contribution/Originality: The contribution of this research is having developed an authentic science assessment model with a preliminary investigation, design, realization/construction, test evaluation revision, and quality prototype approach which has never been done before.

1. INTRODUCTION

Teachers, and learning process. They view that the curriculum is first assessment: something continuous, interrelated all happening at the same time, and both strongly influence each other as, assessment process as an integral part of learning.

Paper and pencil tests are the only evaluation tools carried out in learning so that all student competencies cannot be measured (AlHouli & Al-Khayatt, 2020; Kurniawati & Sukardiyono, 2018; Mohamed & Lebar, 2017; Mongkuo & Mongkuo, 2017; Susani, 2018; Suwartono & Riyani, 2019). While authentic assessment can measure all student competencies (Inayah, Komariah, & Nasir, 2019; Moria, Refnaldi, & Zaim, 2017; Setyawarno & Kurniawati, 2018).

2. THEORETICAL FRAMEWORK

2.1. Authentic Assessments

Complex situations authentic (Centoni & Antonello, 2021; Moria et al., 2017; Salirawati, 2021; Suarimbawa, Marhaeni, & Suprianti, 2017; Sutarto & Jaedun, 2018; Wiethe-Korprich & Sandra, 2017) authentic assessment of educational achievement directly measures actual performance in the subject area (Fynn & Elias, 2022; Sholihah, 2021; Sutarto & Jaedun, 2018) picture students have show students is obtained (Aiken, 2013). In general examples of techniques authentic assessments are shown in [Table 1](#).

Table 1. Techniques of authentic assessments.

Students can demonstrate that activity involves complex skills that are difficult to be assessed through paper and pencil tests.	
Plan and carry out experiments	Creating graph data
Writing stories, essays, poetry	Creating the chart
Give oral reports	Noting the observations
Being a peer tutor	Asking question
Creating of journal	Improvise
Interviewing informants	Creating computer programs
Being in a local travel guide	Searching for information in the library and etc
Correspond with authors science	Completing the literature review

Organizing authentic assessments as in [Figure 1](#) Carin (2017) and Agus and Suprianti (2017).

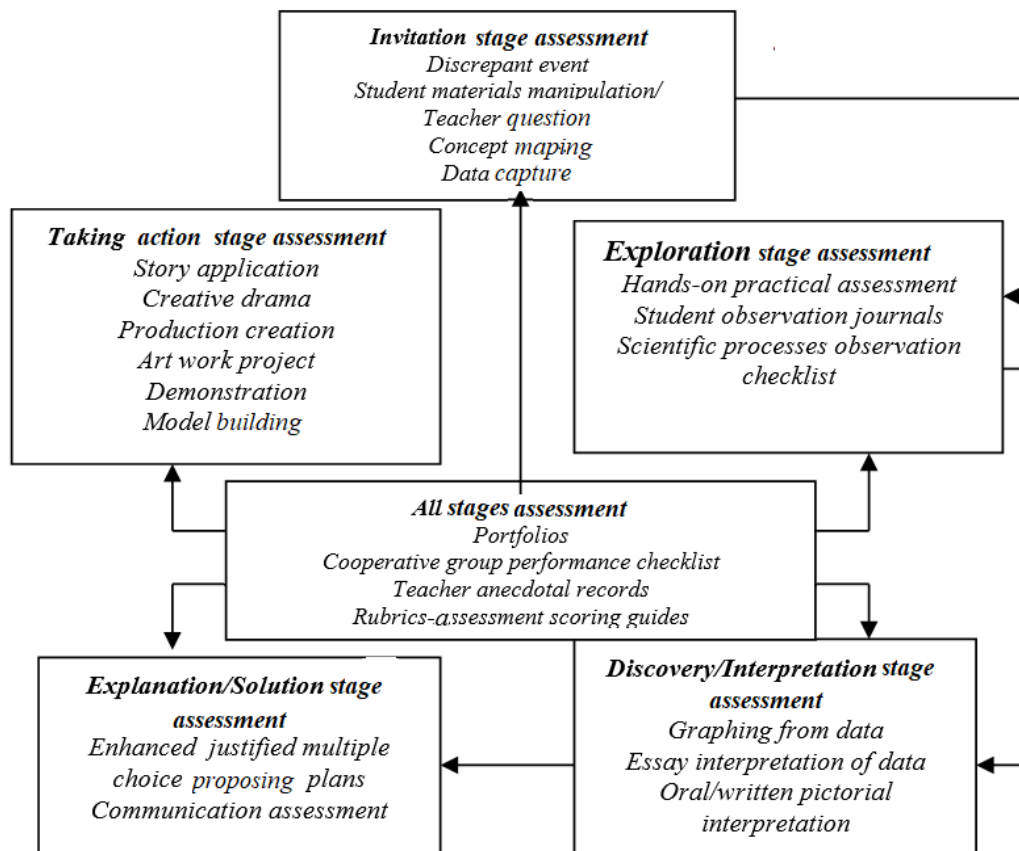


Figure 1. Authentic assessments organization in the learning cycle stage.

2.2. Implementation of Authentic Assessment

Implementation of authentic assessment at each stage can be described briefly (Kurniawati & Sukardiyono, 2018).

13. *Invitational stage*

Authentic assessments aimed to obtain information about the initial understanding of the students on a particular topic or concept. The technique used, among others, included asking questions orally or in teacher-oriented writing to provoke students' opinions, and presenting photos or illustrations that demonstrate a process or a particular situation.

14. *Exploration stage*

At this stage, assessment aims to explore the ability of science process skills in students. Assessment techniques may be hands-on/minds-on activity including the assessment of student activities and student observation journal.

15. *Explanation stage*

Authentic assessment done on the competence of students in observation, analysis, and communication.

16. *Action stage*

In this stage, the assessment aims to uncover the student's ability to apply his understanding of a concept in other situations. The resulting product can be student demonstrations, role playing, oral or written communications, handicrafts, and others.

3. METHOD

3.1. *Types of Research*

This research can be categorized as developmental research. The development of authentic assessment models or SAS models and instruments required. The development of research-oriented products SAS models qualified in the aspect of validity, practically, and effectiveness.

3.2. *Research Sites*

This research was conducted in senior high school Sungguminasa in accordance with the needs of the development of science authentic assessment (SAS) models.

3.3. *Participants*

The subjects were the students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. The sample size of research subjects in the test phase was 30 students.

3.4. *Development Operational*

Operational development of authentic models of science assessment [Figure 2](#).

Operationally the development of SAS models done simultaneously, so that when the validity of the model SAS criteria have not been met, then when revising the devices (partially or completely) done simultaneously revise SAS models support device and related instruments. Suppose revisions subject matter, it is done simultaneously revisions to the plan of teaching, and performance assessment tasks and rubrics.

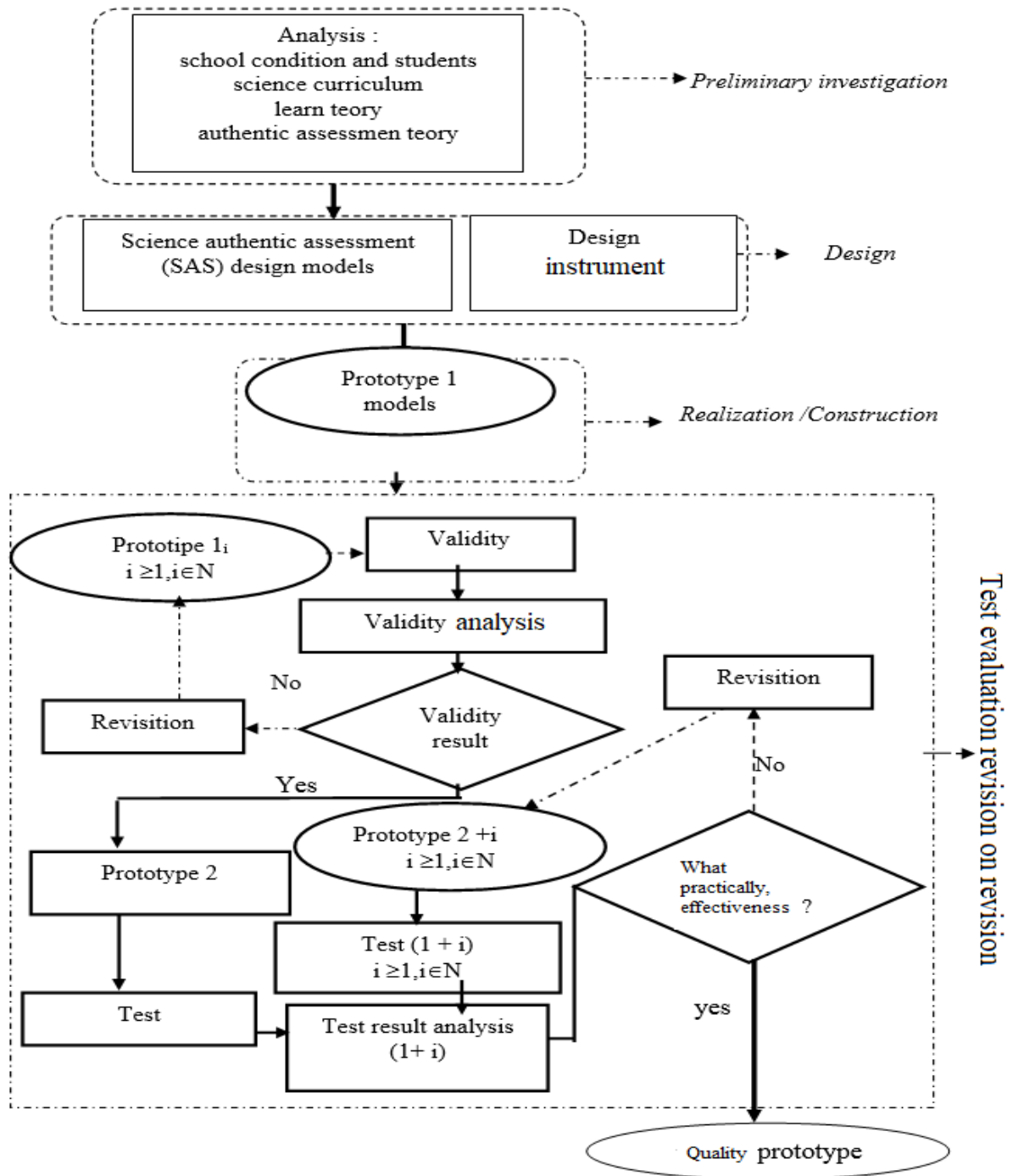


Figure 2. Development operational SAS models.

Remarks :

□ : Aktiviti process : Requirement

: Development operational : Main flow

○ : Aktiviti results

- - -> : Needs if syclus process

3.5. Instrument

The instruments consisted of (1) SAS models validation sheet; (2) science achievement test; (3) questionnaire; and 4) the observation sheet. These instruments were validated by five experts associated with the evaluation and validation of the content of the construct validation. The tests showed that these instruments were eligible for use in research.

3.6. Data Analysis

Data validity analysis, practicality, and effectiveness analysis using the theory Neveen (Huizinga, Handelzalts, Nieveen, & Voogt, 2014) and Veugen, Gulikers, and Brok (2021) in [Table 2](#).

Table 2. Material quality.

Quality aspects		
Validity	Practicality	Effectiveness
Intended (Idea+ Formal :	Consistency between	Consistency between
-State of the art knowledge	-Intended ↔ Perceived	Intended ↔ Experiential
-Internally consistent	- Intended ↔ Operational	Intended ↔ Attained

Criteria for the categorization of quality SAS models using criteria by Bloom, (Fauzan, Plomp, & Gravemeijer, 2013) with the following steps.

- j. Calculate average results of the validation of formula $k_i = \frac{\sum_{j=1}^n V_{ji}}{n}$ with k_i = average, the results

- k. Calculate average of formula $A_i = \frac{\sum_{j=1}^n k_{ij}}{n}$

k_{ij} : Average sub-aspkei to j

n: The number aspect sub-aspects of the aspects of the i-th

- l. Calculate for a mean total (VR) with the formula $VR = \frac{\sum_{j=1}^n A_i}{n}$,

[Table 3](#) presents the Validity of the SAS model (Chakraborty, Dann, Mandal, Dann, & Paul, 2021).

Table 3. Validity of the SAS model (Chakraborty et al., 2021).

Scor interval	Validity criteria
4 ≤ VR ≤ 5	Very high
3 ≤ VR < 4	High
2 ≤ VR < 3	Less
1 ≤ VR < 2	Low

Note: VR is the average total of the results of the assessment of experts, practitioners, and observers.

A data analysis and the students' response to the implementation of the supporting components of SAS models and data from questionnaires to determine the A positive response, meaning that students support, feel happy, interested in the components and the learning process through the implementation of SAS models. A negative response otherwise. To determine the achievement of the objectives of the activity implementation of SAS models in terms of the students' responses, when the the number of studied.

This is the degree of achievement of competence is the percentage of student mastery of the content and performance of the basic competencies of 80% of the basic competencies that have been set can be achieved (Wong, Bajwa, & Fienup, 2022). States, a program of teaching and learning activities otherwise very effective, if to reach benchmark reference value set beforehand. Because the matter refers to the indicators, the values obtained by the students representing the student's mastery of the indicator is represented by the question, so that the control indicators can be expressed as the total value obtained by the students.

The criteriastated mastery learning with application of SAS models are a minimum score 80 (the maximum is 100). Interval score determining the level of student mastery (LSM) categorized (Wong et al., 2022).

[Table 4](#) presents Criteria for level students' mastery (LSM).

Table 4. Criteria for level students' mastery (LSM).

Interval score	Category
$90 \leq \text{LSM} \leq 100$	Very high
$80 \leq \text{LSM} < 90$	high
$70 \leq \text{LSM} < 80$	less
$60 \leq \text{LSM} < 70$	low
$0 \leq \text{LSM} < 60$	Very low

Note: LSM is the average of the results of the level of student mastery of experts, and practitioners.

4. RESULT

4.1. Environmental Needs Analysis

Based on the results of the response to 350 parents, about the implementation of the assessment Scinecein schools found that almost all parents want their information on the progress of the learning progress sisiwa from time to time and comprehensively, namely the development in cognitive, affective, and psychomotor aspects. This trend indicates that the marking system "paper and pencil test" (written test) conducted in schools during this time should be time takes a form of alternative assessment as a complementary system of written test. It is very urgent to do given that written tests can not assess all students' abilities, on the other hand people have a tendency to get information about the three aspects. This is in accordance with the opinion of [Svidzinskaya, Baskin, and Mezentseva \(2019\)](#) and [Miller-Young, Marin, Poth, Vargas-Madriz, and Xiao \(2021\)](#) which states that by applying the assessment, the student's attitude competence can be measured

The assessment system that can address the needs of this community one of them is a model of SAS, it is quite reasonable, therefore, SAS models is one kind of assessment that has a philosophy of continuous assessment. The philosophy states that people eat to get the picture on the profile of the students, then of course the student should be photographed from all sides, not only in terms of cognitive, but affective, and psychomotor aspects need to be considered. These three aspects of this ability is absolutely developed simultaneously, as required in the curriculum of 2013.

On the results of this survey also found the information interesting to observe. First, in general, people wish that the assessment criteria used in the school to be communicated to students. It means that the assessment criteria used in assessing performance results (assignments, papers, daily tests) in school it was time delivered to students. Second, the public generally believes that students need to be included in assessing performance outcomes, it means that the community is aware of their students need to be trained assess themselves against the results of its performance. Therefore with trainer this ability, the students will be able to determine the "weakness" and "strength" has, so that in the end the students can have the ability to overcome the problems faced in everyday life. This is in accordance with the opinion of [AlHouli and Al-Khayatt \(2020\)](#) and [Syaifuddin \(2020\)](#) which states that by applying the assessment, student skill competencies can be measured

The public need information about the assessment criteria can be answered by applying SAS models, because in this SAS model of the assessment criteria for every aspect of the student's performance has been set and similarly about self-assessment. In the model of SAS students assess themselves, both self-assessment and assessment of the results of their performance themselves against participation in the group. Assessment of student' performance results in SAS models, teachers and students both of them provided a score for performance results.

The results of survey study the response of parents as one of the elements in the community, it can be said that people's needs is in accordance with the benefits rather than the model SAS, namely by applying the SAS models in the school, the parents/guardians of students able to: (1) identify the weaknesses and strengths students in learning. This can be achieved, because each performance results achieved by students, the parents make comments/response to the achievements of the son/daughter. Parents have the opportunity to provide motivation and expression of expectations to be achieved; (2) determine kind of guidance to be done by the parents of students for achievement son/daughter, and (3) improvement of communication with the school in educating students.

The questionnaire results of five teachers of science in senior high school Sungguminasa, obtained information that in general teachers do not do the "feedback" to the results of performance (tasks, daily tests, and repeat the semester) their students, sometimes giving information on the assessment criteria, and never give a chance to students to assess themselves against the results of its performance. It means that there is a gap between the needs of the community with the implementation of the system of assessment in schools. Society nowadays need information how the learning progress of students in the school from time to time and in a comprehensive manner, the criteria used in the assessment, and trained students assess themselves, on the other hand it turns out these needs are not fully met.

The survey results mentioned above, this information reinforces the need to develop SAS models questionnaire results from 350 students showed that the suitability of the information contained on the teacher and the information from students, and students in general have a tendency to know the progress of learning results. It means that all the results of student performance over time needs to be informed, so that students can find out how their learning progress. The survey results of laboratory equipment, it still needed some laboratory equipment to support the implementation of SAS models. Laboratory equipment needed are: (1) tools calorimeter; (2) technical balance tool, and (3) expansion tool agent. The equipment is borrowed from physics laboratory, State University of Makassar. This can be realized because of the cooperation between the senior high school Sungguminasa and the University of Makassar. While the means of tables, benches, and laboratory equipments to support the implementation of SAS models. Therefore the form of tables, rectangular practicum students then setting the seating positions facing each other in the student made scientific activities (activities observing and experimenting). From the survey result means seating and tables that show the ingredients lab strongly supports the implementation of SAS models.

4.2. Analysis Curriculum

4.2.1. Analysis Front End

SAS model development is done to enhance the assessment system in cooperative learning and assessment models Hibbard. In the cooperative learning, assessment component is still some weaknesses. The weaknesses include more emphasis on the assessment of learning outcomes achieved by students at the end of the lesson and less emphasis on assessment of student performance results. To complement these weaknesses SAS models then developed a model based on the model assessment Hibbard. However, on the model of Hibbard's assessment there are still some weaknesses that need to be improved, including the absence of a self assessment against the group and there is no element of motivating both teachers and parents/guardians of students. On the other hand, this element is one element that is needed by the community in accordance with the results of surveys that have been described previously.

SAS models development is needed grounding theories were strong and intertwined between the theory and other theories. Based on the results of the literature review obtained several theories that support the development of models of SAS include: (1) understand cognitive; (2) understand constructivist: learning theory Piaget, learning theory Vygotsky, learning theory Bruner, learning theory Polya; (3) learning theory Ausebel; (4) Malmivuori learning theory; (5) theory class assessment: Herman, Ascbacher, and Winter, (6) theory class assessment Webb; (7) the theory of authentic assessment. According to his assessment of education experts and scientific experts who becomes validator in this study stated that these theories are very powerful and interlinked between the theory and other theories. These theories are very eligible as supporting theory in the development of SAS models.

4.2.2. Analysis of Students

The results of the initial analysis of the ability of mastering the concept of temperature and heat of 371 students, obtained information that many concepts of temperature and heat are not yet mastered by the student. It is shown from the results of the initial test material temperature and heat, the average score was only 4.85. There are only two classes who gets an average score above six. Based on this information, the concepts are not yet mastered by the student still needs to be given to the student book.

Students in participating in the implementation of SAS models are divided into groups, each group consisted offivestudents. In this group division wasbased on ability, gender, and type of parts. Information about the ability, gender, and type of tribal students was obtained from the survey results. The data obtained from the student's ability documentation data Certificate of Examination Results. On the distribution of group members based on the theory of the division of Lie groups. The group division based on gender, and type of parts it is possible to do, because based on the data from the survey found that the ratio between the number of female students and male almost as many, nor about the type of clan (Bugis and Makassar tribe).

In this study, in addition to the information level of student ability, gender, and ethnicity are also needed information on the work of parents. The data about the job of parents is needed, because in the implementation of SAS models include aspects of the comments of parents on student achievement that has been accomplished. Based on the survey results, the work of parents/guardians support the implementation of SAS models, because in general the parents/guardians of students have a higher education. It means that all parents/guardians of students able to provide comments / feedback on the performance of their child.

The questionnaire results from 350 students, obtained information that the desire of the parents/guardians of students and students themselves have the same tendency, which both require assessment of learning outcomes of physics in schools is done from time to time and thoroughly (cognitive, affective, and psychomotor), the need for "feedback" immediately, and the assessment criteria used by teachers need to be delivered to students.

4.2.3. Analysis Material

In the analysis phase begins with the material provides the initial test to 390 students. Initial test material is the material temperature and the heat that has been studied by students. This initial test aims to determine the concepts of temperature and heat. Which has not been mastered by the students as a prerequisite to the concepts of temperature and heat the material. Results from this information, as a basis model of SAS software development by incorporating these concepts into their teaching.

Based on the results of this initial test, there are some concepts and understanding of the material and the temperature of heat required to be disclosed in the students' books. Concepts that still need to be "suppression" in the implementation of SAS models are: (1) the concept of temperature; (2) comparative scale thermometer, thermometer function concept, and the concept of the type of liquid in a thermometer; (3) the concept of water anomaly; (4) The heat unit concept, the concept of heat transfer; (5) the concept of specific heat, and the heat capacity; (6) the sense heat of evaporation, condensation understanding, and understanding the melting heat.

The results of the analysis of the structure of the content that was developed based on the contents of Curriculum 2013, in particular temperature and heat the material, it was found that the 2013 science curriculum senior high school is no longer the elaboration of indicators. It means that teachers are required to create indicators and specific learning objectives. Based on this information, it is in the development of learning tools described pembelajaran indicators and objectives specific to each Lesson Plan, and in each of the learning plan comes with authentic assessment sheet. The task analysis was conducted to identify the stages of completion of tasks in accordance with the temperature of the material and heat. Analysis of these tasks include the analysis of the content and concept analysis. The final result of the analysis contained in the task of "student 'performance, and authentic assessment sheet). The results of observations of two observers on the ability of the students in the psychomotor aspects included in the high category with average yield of psychomotor abilities of 91. Similarly, the tasks implemented on SAS models, in the form of task performance which consists of duty to report the results of observations or experiments, in general, students do well, it can be seen from the result of the ability of process skills which the average value of students reached 81 on the pilot phase of 90, the task doing the competency test in general students can do, it can be seen from the average results study on cognitive aspects in pilot phase 90. the task of the students assess themselves against the results of self-assessment of its performance and its participation in the group also generally do well, as seen in the learning outcomes in the affective aspects of 82 on the pilot phase of 90, and when analyzed data from observations of two observers show that all students are engaged in class discussions, conduct cooperation in scientific activities, ask the same friends and teachers, provide ideas. Similarly, data from the questionnaire results in the affective aspect of learning outcomes showed that the results were consistent with the observations and the results of the students' statements within the SAS models, all of which showed average values above 80. It was proved that the learning outcomes of students in a very affective aspects reliable. That is, there is a match between the observer and the statement of the results of a respondent. While the selection task, and the task of reflection also on the subject matter students are generally well done, but the results rather than the student's performance is not analyzed further, because the results of the performance of these tasks is the result of group work done at home. However, that does not mean it has no effect on the motivation of the students, because the value of the group is taken as a reference in awarding the prize to the group. This scenario is delivered to students, so that they are motivated to do the work of the group, both in completing observation or experiment, and perform tasks in the home. The results of the analysis of the information indicates that some of the concepts of temperature and heat that previously have not been mastered by students based on the results of the initial tests (material temperature and heat in Junior high school) at the time participated in the implementation of the model SAS these concepts can already be controlled, which is reflected in the value of the average learning results obtained during the implementation of SAS models by 79 in the test phase at 90. While the average initial test results only 40.

The results obtained from the analysis of the concept of teacher responses indicate that 100 percent of teachers said that the analysis of this concept is very helpful in implementing SAS models. It means that the analysis of the concept is practically implemented in SAS models.

4.3. SAS Models Validation Results

Data content includes the validation results supporting theories SAS models development and validation constructs include constructs linkages between components of SAS models in the category of valid and fit for use. The results of the validation content and construct models of the SAS in [Table 5 and 6](#).

Table 5.Dataofvalidity results module science authentic assessmentcontent.

No	Rated aspect	Theaverage aspect Ai
1.	Supporting theory model of science authentic assessment	4.1
2.	Step-by-step implementation model of science authentic assessment	3.9
3.	The social system in the implementation model of science authentic assessment	3.9
4.	The principle of the model management reaction science authentic assessment	4.0
5.	SAS models support system implementation	3.9
6.	Impact of the implementation and impact of the model companion science authentic assessment	4.0
7.	Implementation of the model of science authentic assessment	4.1
8.	The learning environment and management duties science authentic assessment models	3.8
9.	science authentic assessment models evaluation	3.9
	The average total (VR) = 3.9	

Note: Ai is the average of the results of validitymodule science authentic assessment content.

4.4. Expert Commentary

Rate in general expert states that the theories that support the development of authentic assessment science is very solid and intertwined among the theories described in SAS models. The suggestions of the expert of which is in the handbook and supplements SAS models should be made more compact (without reducing essential things) that have high readability and acceptability. All devices are generally decent SAS models used in the field for data retrieval research. Revisions to the book model of SAS on the criteria for assessment of the results of scientific activity, namely criteria: create questions, formulate problems, make hypotheses, create tables, create graphics, reading charts, making predictions, designing experiments (formulate variable manipulation, response variables, control variables, manipulation variable definition, the definition of control variables) and make inferences.

Table 6. Data of validityresults construct components science authentic assessmentmodel.

No	Rate aspects	The average aspects Ai
1.	science authentic assessment model components	3.9
2.	science authentic assessment models support the theory	4.1
3.	Step-by-step implementation of science authentic assessment models	3.8
4.	The social system in the implementation of science authentic assessment models	3.8
5.	Reaction principle management science authentic assessment models	3.9
6.	science authentic assessment models	3.8
7.	the implementation Bridesmaids science authentic assessment models	3.6
8.	Implementation of science authentic assessment models	4.1
9.	The learning environment and management duties models science authentic assessment	3.7
10.	science authentic assessment model evaluation	4.3
	The average total (VR) = 4.2	

Note: Ai is the average of the results of validityconstruct components science authentic assessment model.

4.5. Expert Commentary

In general, states that the link expert contents of the components of SAS models are interrelated and do not find any contradiction between what the contents of the book with the device SAS models. Comments and suggestions from the expert including SAS models guidebook packed with modern learning theory is very relevant to the central theme of research. The handbook should be made more compact, attractive and avoid some mistakes topography.Data validation results SAS model development support device consisting of [Table 6](#): planning for learning; [Table 7](#): task authentic assessment; [Table 8](#): result validity assessment authentic supplement,[Table 9](#): guidelines for teachers; [Table 10](#): guidelines for students, and [Table 11](#): book of students all supporting devices in the category of valid and fit for use.

Table 7. Lesson planning data validity results.

No.	Rate aspects	The average aspects Ai
1	Indicator	3.9
2	The contents of the subject matter	4.0
3	Language	3.8
4	Time	3.9
5	Teaching methods	3.7
6	Learning closed	3.9
Average total (VR) = 3.8		

Note: Ai is the average of the results of validity Lesson planning.

Table 8. Date of validity result student' activity sheet.

No	Rate aspects	The average aspects Ai
1	Organisation	4.0
2	Prosedure	3.7
3	Question/problem	3.7
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity student' activity sheet.

Table 9. Date of validity result authentic assessment suplement.

No.	Rate aspects	The average aspects Ai
1	Organisation	3.9
2	Prosedure	3.9
3	Question/problem	3.9
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity authentic assessment suplement.

Table 10. Data of validity results teacher manual.

No	Rate aspects	The average aspects Ai
1.	Introduction	3.9
2.	Science problem representation	4.2
3.	Learning method	3.8
4.	Learning closed	3.9
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity teacher manual.

Science achievement test consisting of a test product, scientific knowledge tests, and performance tests at tested to 43 students. The test consists of 24 items of products, after testing produced 23 items that valid and an invalid item. The tests show that the contents of the item 23 to be able to represent all the material temperature and heat with the level of reliability 0.99. Scientific knowledge test consists of 23 items, after testing produced 23, is 0.99. The performance test of 10 items, after testing produced is 0.72.

4.6. Effectiveness of Models SAS

Table 11 shows the results of teacher feedback on the effectiveness of the implementation of SAS models. The teachers in assessing the effectiveness of using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

Table 12 presents Data validity results student book.

Table 11. Data of validity results student manual.

No	Rate aspects	The average aspects Ai
1	Sub organization concept	3.6
2	Translation of troubleshooting steps temperature and heat	3.9
3	Activity	4.4
4	Learning closed	4.2
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity student manual.

Table 12.Data validity results student book.

No	Rate aspects	The average aspects Ai
1	Translation of material	3.9
2	Construction	3.9
3	Exercise	4.0
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity student book.

Table 13 presents Data on the effectiveness of the authentic assessment science models.

Table 13.Data on the effectiveness of the authentic assessment science models.

No	Rate aspects	The average aspects Ai
1	Student learning outcomes	4.1
2	Student response against components and implementation Process science authentic assessment models	4.1
Average total (VR) = 4.1		

Note: Ai is the average of the results of effectiveness science authentic assessment models.

4.7. Practicality of Models SAS

Table 14, shows the practicality of the model based on the observation SAS with implementation SAS models support device.

Table 14.Data on implementation of supporting device for science authentic assessment model.

No	Rate aspects	The average aspects Ai
1	Measures implementation of science authentic assessment models	3.1
2	Social systems implementation of science authentic assessment models	3.9
3	Reaction principle management science authentic assessment models	3.8
IO value or value average total (VR) = 3.6		

Note: Ai is the average of the results of implementation of supporting device for science authentic assessment model.

Remarks:

IO is intended \Leftrightarrow Operational

Science achievement test scores found that the level of student mastery (LSM) of the subject matter of science high 90 and 100 percent of students completed. Students' response to the implementation of science authentic assessment models is a slight positive, according to the teacher's response to the ease of implementing science authentic assessment models is positive.

Table 15.Data of comments student questionnaire response to the question on of science authentic assessment.

No.	Comment	
	First question	The second question
1	Yes, because all of a language that is very easy to understand	Yes, because in the book student, student worksheet, student manual, and supplements science authentic assessment already written clearly accompanied by images that can allow me to learn.
2	Yes, the explanation of the book student, student worksheet, student manual, and supplements science authentic assessment easy to understand and clear explanation	Yes, because the appearance of such a book students, student worksheet, student manual, and supplements science authentic assessment students will be more interested in reading and with their images with easy to understand explanations.
3	Yes, because the language used is the language and its standard sentence too short and clear so easy to understand.	Yes, because with the article with pictures easier for students to understand the intent rather than the text.
4	Yes, I can understand the language used in the book student, student worksheet, student manual, and supplements science authentic assessment	Yes, because if the appearance of text, large font, image, layout and color pictures in books student, student worksheet, student manual, and supplements science authentic assessment, the learning atmosphere we will not be boring and happy doing his work.

[Table 15](#) following several students comment on questions related to the implementation of SAS models support device.

7. Are you able to understand the language used in the book Student, Student Worksheet, Student Manual, and supplements science authentic assessment?
8. Are you interested in the appearance (text, large font, image, layout images, colors) books Student, Student Worksheet, Student Manual, and supplements science authentic assessment?

Table 16. Expert response data regarding the implementation of science authentic assessment model.

No	Aspects observed and judged	Average aspect Ai
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation model of science authentic assessment	4.2
3	Principle reaction models management science authentic assessment	4.3
Average total = 4.2		

Note: Ai is the average of the results of expert responses regarding the implementation of science authentic assessment model.

[Table 16](#), shows the results of the responses of six education experts regarding enforceability of SAS models theoretically in the field. Educational experts in assessing the enforceability of SAS models in the classroom by using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

[Table 17](#), enforceability of data models in a class derived from the observation of two (2) people watchers. Observers in observing the implementation of SAS models during seven meetings using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high; 5 is very high.

Ratings among experts on the implementation of SAS models is theoretically consistent with the observation observer SAS model implementation in the classroom 4.2 it indicates that that the application of SAS models in practical classes.

Table 17. Observation result data on the implementation of the science authentic assessment models.

No	Aspects observed and judged	Average aspect Ai
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation models of science authentic assessment	4.3
3	Principle reaction models management science authentic assessment	4.2
Average total = 4.2		

Note: Ai is the average of the results of observation on the implementation of science authentic assessment model.

5. DISCUSSION AND CONCLUSION

5.1. Discussion

The analysis of the validity and practicality found that SAS models support device is valid criteria and practical criteria applied in assessing student competence. Student competency can be assessed in a comprehensive and sustainable. [Muho and Taraj \(2022\)](#) found that formative assessment practices affect students' motivation in learning English.

Student learning outcomes include cognitive aspects (products and processes), affective, and psychomotor aspects obtained from the authentic supplement the assessment indicates that results for students in the pilot phase already meets the standards of competence specified achievement. This is caused because all the planning done well. Similarly, the results obtained from the student learning achievement test at the end of the implementation of the model. This means that the device is SAS models meet the criteria effectiveness. [Chi, Xiu, and Zuhao \(2021\)](#) conducted a study related to comparing student science, found for participants.

Results of student and teacher responses to the components and implementation of SAS models show a positive response. It shows that in the aspect of student and teacher responses to the components and implementation of SAS models meet the criteria of effectiveness. That is, the entire device is SAS models support the implementation of learning in the classroom is expected that students will be more motivated to learn science.

Based on the results of this questionnaire are generally teachers found the necessary and feasible SAS models developed on the subject of how to do more with the device making training and accompanied by the provision of laboratory equipment in accordance with the required media in the implementation of the SAS models. Similarly, the teacher stated that the strategy of implementation of SAS models can be used as a primary strategy in learning science. [Vahidnia, Behzad, and Hesamoddin \(2021\)](#) and [Fauzan et al. \(2013\)](#) also

developed and validated an instrument of student attitudes towards teachers to find differences in the level of student attitudes

Both results are very appropriate response to the comments of experts based on their knowledge and experience theoretically. It proved empirically SAS model implementation in the field which is derived from the observation of two (2) observers indicate that the average yield assessment scores of both observers in the high category and reliable. Thus, it can be said that the implementation of SAS models is theoretically supported by empirical data in the field with high reliability. That is, the implementation of SAS models although observed by different people and different conditions will give consistent results. Toma (2021) developed Instrument and psychometric evaluation

Teachers initially still faces obstacles in implementing SAS models, it is because, as a model system SAS is a form of assessment and learning system innovation. As it like an innovation, then the SAS models requires a shift in perspective from teachers, the community, including a shift in perspective parents. Changing the way it is not an easy task, but requires hard work and commitment. Teachers are required to be able to pay attention to individual students, monitor progress, encourage them more activity, collecting every student work to be comments, and so forth. All it requires extra time and effort. Therefore, teachers lack strong motivation in their profession, it would be difficult to implement this SAS models. The difference between this study and that developed by Chi et al. (2021) and Matsumoto-Royo and Ramírez-Montoya (2021) and Wong et al. (2022) is only Instrument Knowledge development.

In the next phase, the teachers have been able to overcome the obstacles perceived in the early stages. Teachers, giving students the opportunity to assess themselves to the task with a friend based on the guidelines assessment authentic. Teachers keep checking on the results of this self-assessment. The impact than self assessment is that it will foster honesty of students in doing the job. SAS Models has some weaknesses in the implementation of the class are: (1) due to the limitations of the researcher, only two observers to observe social skills, psychomotor skills of students, and enforceability of SAS models. This is done with the consideration that if the use of many observers, it can affect the process of implementation of SAS models in the classroom; (2) observation of social skills, and psychomotor skills performed in all groups. This is done with the consideration that social skills and psychomotor skills a person can not be sampled for other people. All information to assess social skills and psychomotor skills, then observations were made only one group at each meeting. Since a lot of meetings in the implementation of SAS models as much as seven meetings either at trial. The disadvantage of this observation is the observation frequency becomes a little bit, but the excess all students accessed.

5.2. Conclusion

Conclusions of this study resulted in SAS models qualified products meet the criteria of validity; practicality and effectiveness. The results of students in the high category and the response of students and teachers on the implementation of positive SAS models. This is in accordance with the opinion of Wiethe-Korprich and Sandra (2017) and Toma (2021); Suwartono and Riyani (2019) which states that by applying the assessment, students' knowledge competence can be measured (Setyawarno & Kurniawati, 2018) and Sutarto and Jaedun (2018).

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REFERENCES

- Agus, K., & Suprianti, G. A. P. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Aiken, L. R. (2013). *Psychological tests and evaluation*. Mexico: Pearson.
- AlHouli, A. I., & Al-Khayatt, A. K. A. (2020). Assessing the soft skills needs of teacher education students. *International Journal of Education and Practice*, 8(3), 416-431. <https://doi.org/10.18488/journal.61.2020.83.416.431>
- Carin, A. A. (2017). *Teaching science through discovery* (8th ed.). New Jersey: Prentice Hall.
- Centoni, M., & Antonello, M. (2021). Students' evaluation of academic courses: An exploratory analysis to an Italian case study. *Studies in Educational Evaluation*, 70, 101054. <https://doi.org/10.1016/j.stueduc.2021.101054>
- Chakraborty, S., Dann, C., Mandal, A., Dann, B., & Paul, M. (2021). Effects of rubric quality on marker variation in higher education. *Studies in Educational Evaluation*, 70, 100997. <https://doi.org/10.1016/j.stueduc.2021.100997>
- Chi, S., Xiu, F. L., & Zuhao, W. (2021). Comparing student science performance between hands-on and traditional item types: A many-facet Rasch analysis. *Studies in Educational Evaluation*, 70, 100998. <https://doi.org/10.1016/j.stueduc.2021.100998>

- Fauzan, A., Plomp, T., & Gravemeijer, K. (2013). The development of an RME-based geometry course for Indonesian Primary schools. In T. Plomp, & N. Nieveen (Eds.), *Educational design research - Part B. Illustrative cases*. In (pp. 159-178). SLO: Netherlands Institute for Curriculum Development.
- Fynn, A., & Elias, O. M. (2022). Continuous online assessment at a South African open distance and e-learning institution. *Frontiers in Education Original Research*, 27(79), 1-13. <https://doi.org/10.3389/educ.2022.791271>
- Huizinga, T., Handelzalts, A., Nieveen, N., & Voogt, J. M. (2014). Teacher involvement in curriculum design: Need for support to enhance teachers' design expertise. *Journal of Curriculum Studies*, 46(1), 33-57. <https://doi.org/10.1080/00220272.2013.834077>
- Inayah, N., Komariah, E., & Nasir, A. (2019). The practice of authentic assessment in an EFL speaking classroom. *Studies in English Language and Education*, 6(1), 152-162. <https://doi.org/10.24815/siele.v6i1.13069>
- Kurniawati, A., & Sukardiyono, S. (2018). The development of authentic assessment instrument to measure science process skill and achievement based on students' performance. *Journal of Physics Education Research & Development*, 4(2), 65-74. <https://doi.org/10.21009/1.04203>
- Matsumoto-Royo, K., & Ramírez-Montoya, S. M. (2021). Core practices in practice-based teacher education: A systematic literature review of its teaching and assessment process. *Studies in Educational Evaluation*, 70, 101047. <https://doi.org/10.1016/j.stueduc.2021.101047>
- Miller-Young, J., Marin, L. F., Poth, C., Vargas-Madriz, L. F., & Xiao, J. (2021). The development and psychometric properties of an educational development impact questionnaire. *Studies in Educational Evaluation*, 70, 101058. <https://doi.org/10.1016/j.stueduc.2021.101058>
- Mohamed, R., & Lebar, O. (2017). Authentic assessment in assessing higher order thinking skills. *International Journal of Academic Research in Business and Social Sciences*, 7(2), 466-476.
- Mongkuo, M. Y., & Mongkuo, M. Y. (2017). Testing the factorial equivalence of the collegiate learning assessment performance task diagnostic instrument across lower class and upper class predominantly black college students. *International Journal of Education and Practice*, 5(6), 95-103. <https://doi.org/10.18488/Journal.61.2017.56.95.103>
- Moria, E., Refnaldi, R., & Zaim, M. (2017). *Using authentic assessment to better facilitate teaching and learning: The case for students' writing assessment*. Paper presented at the Sixth International Conference on Languages and Arts (ICLA 2017). Atlantis Press.
- Muho, A., & Taraj, G. (2022). Impact of formative assessment practices on student motivation for learning the English language. *International Journal of Education and Practice*, 10(1), 25-41. <https://doi.org/10.18488/61.v10i1.2842>
- Salirawati, D. (2021). Authentic assessment in the pandemic period. *Journal of The Indonesian Society of Integrated Chemistry*, 13(1), 21-31.
- Setyawarno, D., & Kurniawati, A. (2018). Implementation of authentic assessment in science learning at Indonesian schools. *Journal of Science Education Research*, 2(2), 47-55.
- Sholihah, M. (2021). Authentic assessment in online learning during the covid-19 pandemic. *Edunesia: Scientific Journal of Education*, 2(2), 576-580.
- Suarimbawa, K. A., Marhaeni, A., & Suprianti, G. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Susani, R. (2018). The implementation of authentic assessment in extensive reading. *International Journal of Education*, 11(1), 87-92.
- Sutarto, H. P., & Jaedun, M. P. D. (2018). Authentic assessment competence of building construction teachers in Indonesian vocational schools. *Journal of Technical Education and Training*, 10(1).
- Suwartono, T., & Riyani, C. (2019). Authentic assessment in ELT: Hopes, challenges, and practices. *Reflection on Education: Scientific Journal of Education*, 9(2).
- Svidzinskaya, G. B., Baskin, Y. G., & Mezentseva, M. E. e. (2019). Using the Semantic Differential Method to Assess the Learning Motivation and Attitude of First-Year Students towards Chemistry in University of EMERCOM of Russia. *International Journal of Education and Practice*, 7(2), 88-100.
- Syaifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*, 9(4), 1491-1502. <https://doi.org/10.12973/eu-jer.9.4.1491>
- Toma, B. R. (2021). Measuring children's perceived cost of school science: Instrument development and psychometric evaluation. *Studies in Educational Evaluation*, 70, 101009. <https://doi.org/10.1016/j.stueduc.2021.101009>
- Vahidnia, F., Behzad, G. H., & Hesamoddin, S. (2021). Development and validation of students' attitudes towards teacher's pet phenomenon scale in the higher education setting: Differences by levels of study and grade-point-average. *Studies in Educational Evaluation*, 70, 101000. <https://doi.org/10.1016/j.stueduc.2021.101000>
- Veugen, M. J., Gulikers, J. T. M., P., & Brok, D. (2021). We agree on what we see: Teacher and student perceptions of formative assessment practice. *Studies in Educational Evaluation*, 70, 101027. <https://doi.org/10.1016/j.stueduc.2021.101027>
- Wiethe-Korprich, M., & Sandra, B. (2017). Prospective educators as consumers of empirical research: An authentic assessment approach to make their competencies visible. *Empirical Research in Vocational Education and Training*, 9(8), 2-26. <https://doi.org/10.1186/s40461>
- Wong, K. K., Bajwa, T., & Fienup, D. M. (2022). The application of mastery criterion to individual operants and the effects on acquisition and maintenance of responses. *Journal of Behavioral Education*, 31(3), 461-483. <https://doi.org/10.1007/s10864-020-09420-3>



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AUTHENTIC ASSESSMENT DEVELOPMENT SCIENCE TO ASSESS STUDENT COMPETENCY

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ABSTRACT

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Keywords

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This study authentic models of science assessment in assessing the competence of senior high school students who meet the criteria: validity, practically, effectiveness. Stages, i.e: (1) preliminary investigation, (2) design, (3) realization/construction, (4) test evaluation revision, and (5) quality prototype. This research includes developmental research. This research was conducted in senior high school in accordance with the needs of the development of science authentic assessment (SAS) models. The subjects were students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. Authentic Assessment: Invitational stage, exploration stage, explanation stage, actions stage. Number of research subjects in the test phase as many as 30 students, with instruments, i.e: (1) SAS model validation sheet; (2) science achievement test; (3) questionnaires; and (4) the observation sheet. Data validity analysis descriptive. The findings of the quality authentic science assessment model meet the criteria for high category learning outcomes positive student responses. The SAS model are very worthy of applied science in teaching science for assessing the competence of senior high school students.

Contribution/Originality: The authentic science assessment model with a preliminary investigation, design, realization/construction, test evaluation revision, and quality prototype approach which has never been done before.

1. INTRODUCTION

Curriculum, learning process, and assessment system are three dimensions of the many very important dimensions in education. Assessment to measure and assess the level of achievement of the curriculum and the success or failure of the learning process. Assessment is also used to find out the strengths and weaknesses that exist in the learning process, so that it is used as a basis for decision making, for example whether the learning process is good and can be continued or still needs improvement and refinement. Therefore, in addition to a suitable curriculum and the right learning process, a good and well-planned assessment system is also needed. A professional teacher must master these three dimensions, namely mastery of the curriculum including mastery of the material, mastery of teaching methods, and mastery of the assessment system. If the teacher has a weakness in one of these dimensions, of course the learning outcomes will be less than optimal.

The assessment innovation in the 20213 curriculum implemented in Indonesia is science authentic assessment (SAS). This assessment is carried out in an integrated manner with teaching and learning activities. One of the principles of SAS is a thorough assessment. Assessment of student learning outcomes.

SAS is a new approach that has recently been introduced by educational experts to be implemented in schools in addition to the assessment approach that has been used for a long time, for example paper and pencil tests (AlHouli & Al-Khayatt, 2020; Kurniawati & Sukardiyono, 2018; Mohamed & Lebar, 2017; Mongkuo & Mongkuo, 2017; Susani, 2018; Suwartono & Riyani, 2019).

SAS can provide opportunities for students and teachers to examine how work, especially new work they are currently completing or have completed. The most interesting thing in SAS, i.e. there is integrated cooperation between students and other students as well as between students and teachers; students can improve and refine the results of their performance; students and teachers work concentrating on individual and group work; students understand and use standards, namely basic competencies and indicators contained in the curriculum to assess their abilities both individually and in groups; students have pride, can publish, and exhibit their work.

Learning assessments carried out in schools should not only use paper and pencil tests which are only able to measure cognitive aspects, but need to use other types of alternative assessments that can measure affective and psychomotor aspects. However, in reality, the implementation of the learning process found in schools, especially in teaching science, is limited to products or facts, concepts and theories, and is still carried out in the traditional way (Inayah, Komariah, & Nasir, 2019; Moria, Refnaldi, & Zaim, 2017; Setyawarno & Kurniawati, 2018).

Recognizing that there are various weaknesses in the implementation of temporary and partial assessments in schools, it is very urgent to develop a SAS model to access all student competencies.

Several research questions, i.e. (1) how is the validity of the SAS model for accessing student competencies in senior high schools?; (2) how practical is the SAS model for accessing student competencies in senior high schools?; and (3) how effective is the SAS model for accessing student competencies in senior high schools?

2. THEORETICAL FRAMEWORK

2.1. Authentic Assessments

A new approach to evaluation is authentic assessment. This modality connects teaching to realistic and complex situations and contexts. Also called performance assessment, appropriate assessment, alternative assessment, or direct assessment; authentic assessment includes a variety of techniques such as written products, portfolios, check lists, teacher observations, and group projects. (Centoni & Antonello, 2021; Moria et al., 2017; Salirawati, 2021; Suarimbawa, Marhaeni, & Suprianti, 2017; Sutarto & Jaedun, 2018; Wiethe-Korprich & Sandra, 2017).

Authentic assessment of educational achievement directly measures actual performance in the subject area. It was developed as a result of criticism of multiple-choice tests, which usually only provide a superficial idea of what a student has learned and do not indicate what a student can do with what was acquired. Authentic assessment can provide genuine accountability. All forms of authentic assessment can be summarized numerically, or put on a scale, to make it possible to combine individual results and to meet state and federal requirements for comparable quantitative data (Fynn & Elias, 2022; Sholihah, 2021; Sutarto & Jaedun, 2018). picture students have show students is obtained (Aiken, 2013). In general examples of techniques authentic assessments are shown in [Table 1](#).

Table 1. Techniques of authentic assessments.

Students can demonstrate that activity involves complex skills that are difficult to be assessed through paper and pencil tests.	
Plan and carry out experiments	Creating graph data
Writing stories, essays, poetry	Creating the chart
Give oral reports	Noting the observations
Being a peer tutor	Asking question
Creating of journal	Improvise
Interviewing informants	Creating computer programs
Being in a local travel guide	Searching for information in the library and etc
Correspond with authors science	Completing the literature review

2.2. Implementation of Authentic Assessment

Implementation of authentic assessment at each stage can be described briefly (Kurniawati & Sukardiyono, 2018).

17. Invitational stage

Authentic assessments aimed to obtain information about the initial understanding of the students on a particular topic or concept. The technique used, among others, asking questions orally or in teacher-oriented to provoke students' opinions, and presenting photos or illustrations that demonstrate a process or a particular situation.

18. Exploration stage

At this stage, assessment aims to explore the ability of science process skills in students. Assessment techniques may be hands-on/minds-on activity including the assessment of student activities and student observation journal.

19. Explanation stage

Authentic assessment done on the competence of students in observation, analysis, and communication.

20. Action stage

In this stage, the assessment aims to uncover the student's ability to apply his understanding of a concept in other situations. The resulting product can be student demonstrations, role playing, oral or written communications, handicrafts, and others.

3. METHOD

3.1. Types of Research

This research developmental research. The development of research-oriented products SAS models qualified in the aspect of validity, practically, and effectiveness.

3.2. Research Sites

This research was conducted in senior high school Sungguminasa in accordance with the needs of the development of science authentic assessment (SAS) models.

3.3. Participants

The subjects were the students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. The sample size of research subjects in the test phase was 30 students.

3.4. Development Operational

Operationally the development of the SAS model is carried out simultaneously as shown in Figure 2. If the validation criteria for the SAS model have not been met, then revisions are carried out until the quality requirements of the SAS model are met, i.e: validity, effectiveness, and practicality.

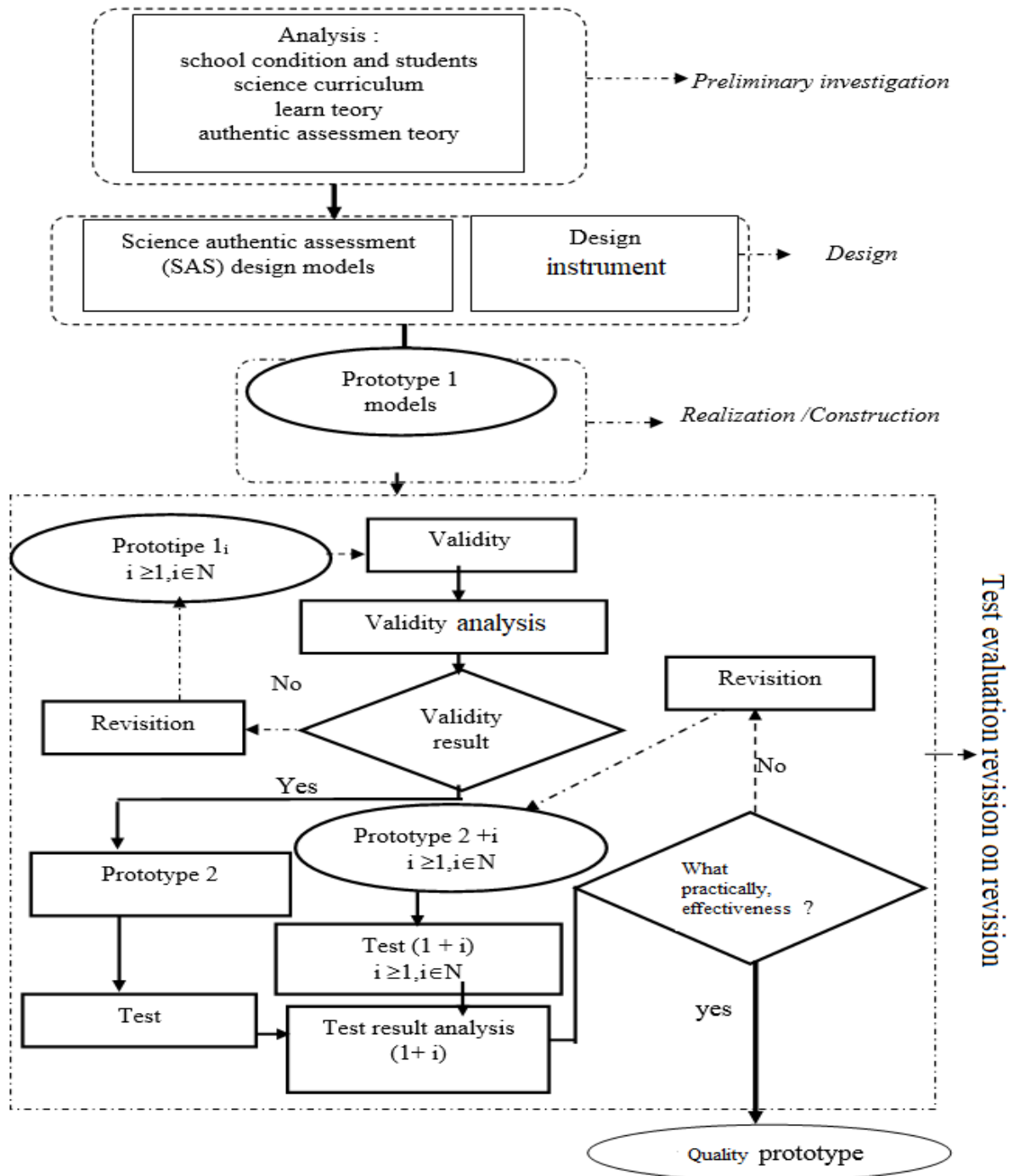








Figure 2. Operational SAS models.

Remarks :

-  : activity process stage
-  : main stages
-  : Development operational
-  : Needs if syclus process
-  : Activity results stage
-  : Requirement results stage

Preliminary investigation, at this stage analysis is carried out: related to school conditions and students science curriculum learn theory authentic assessment theory. The goal is to get information on SAS indicators. Design, at this stage SAS design models and research instrument designs are made. Realization/Construction, this stage produced a prototype-1 SAS model. Evaluation and revision tests, at this

stage validation of the prototype-1 SAS model is carried out, analyzing the results of the validation, revising it until a prototype of the SAS model is obtained that meets validity, is effective and practically.

3.5. Instrument

Instruments used in this study, i.e: (1) SAS model validation sheet; (2) science test; (3) questionnaires; and 4) observation sheet.

3.6. Data Analysis

Data validity analysis, practicality, and effectiveness analysis using the theory Neveen (Huizinga, Handelzalts, Nieveen, & Voogt, 2014) and Veugen, Gulikers, and Brok (2021) in [Table 2](#).

Table 2. Material quality.

Quality aspects		
Validity	Practicality	Effectiveness
Intended (Idea+ Formal):	Consistency between	Consistency between
-State of the art knowledge	-Intended ↔ Perceived	Intended ↔ Experiential
-Internally consistent	- Intended ↔ Operational	Intended ↔ Attained

Criteria for the categorization of quality SAS models using criteria by Bloom, (Fauzan, Plomp, & Gravemeijer, 2013) with the following steps.

m. Calculate average results of the validation of formula $k_i = \frac{\sum_{j=1}^n V_{ji}}{n}$ with k_i = average, the results

n. Calculate average of formula $A_i = \frac{\sum_{j=1}^n k_{ij}}{n}$

k_{ij} : Average sub-aspkei to j

n: The number aspect sub-aspects of the aspects of the i-th

o. Calculate for a mean total (VR) with the formula $VR = \frac{\sum_{i=1}^n A_i}{n}$,

[Table 3](#) presents the Validity of the SAS model (Chakraborty, Dann, Mandal, Dann, & Paul, 2021).

Table 3. Validity of the SAS model (Chakraborty et al., 2021).

Scor interval	Validity criteria
4 ≤ VR ≤ 5	Very high
3 ≤ VR < 4	High
2 ≤ VR < 3	Less
1 ≤ VR < 2	Low

Note: VR is the average total of the results of the assessment of experts, practitioners, and observers.

A data analysis and the students' response to the implementation of the supporting components of SAS models and data from questionnaires to determine the A positive response, meaning that students support, feel happy, interested in the components and the learning process through the implementation of SAS models. A negative response otherwise. To determine the achievement of the objectives of the activity implementation of SAS models in terms of the students' responses, when the the number of studied.

This is the degree of achievement of competence is the percentage of student mastery of the content and performance of the basic competencies of 80% of the basic competencies that have been set can be achieved (Wong, Bajwa, & Fienup, 2022). States, a program of teaching and learning activities otherwise very effective, if to reach benchmark reference value set beforehand. Because the matter refers to the indicators, the values obtained by the students representing the student's mastery of the indicator is represented by the question, so that the control indicators can be expressed as the total value obtained by the students.

The criteriastated mastery learning with application of SAS models are a minimum score 80 (the maximum is 100). Interval score determining the level of student mastery (LSM) categorized (Wong et al., 2022).

[Table 4](#) presents Criteria for level students' mastery (LSM).

Table 4. Criteria for level students' mastery (LSM).

Interval score	Category
$90 \leq \text{LSM} \leq 100$	Very high
$80 \leq \text{LSM} < 90$	high
$70 \leq \text{LSM} < 80$	less
$60 \leq \text{LSM} < 70$	low
$0 \leq \text{LSM} < 60$	Very low

Note: LSM is the average of the results of the level of student mastery of experts, and practitioners.

4. RESULT

4.1. Environmental Needs Analysis

Based on the results of the response to 350 parents, about the implementation of the assessment Scinecein schools found that almost all parents want their information on the progress of the learning progress sisiwa from time to time and comprehensively, namely the development in cognitive, affective, and psychomotor aspects. This trend indicates that the marking system "paper and pencil test" (written test) conducted in schools during this time should be time takes a form of alternative assessment as a complementary system of written test. It is very urgent to do given that written tests can not assess all students' abilities, on the other hand people have a tendency to get information about the three aspects. This is in accordance with the opinion of [Svidzinskaya, Baskin, and Mezentseva \(2019\)](#) and [Miller-Young, Marin, Poth, Vargas-Madriz, and Xiao \(2021\)](#) which states that by applying the assessment, the student's attitude competence can be measured

The assessment system that can address the needs of this community one of them is a model of SAS, it is quite reasonable, therefore, SAS models is one kind of assessment that has a philosophy of continuous assessment. The philosophy states that people eat to get the picture on the profile of the students, then of course the student should be photographed from all sides, not only in terms of cognitive, but affective, and psychomotor aspects need to be considered. These three aspects of this ability is absolutely developed simultaneously, as required in the curriculum of 2013.

On the results of this survey also found the information interesting to observe. First, in general, people wish that the assessment criteria used in the school to be communicated to students. It means that the assessment criteria used in assessing performance results (assignments, papers, daily tests) in school it was time delivered to students. Second, the public generally believes that students need to be included in assessing performance outcomes, it means that the community is aware of their students need to be trained assess themselves against the results of its performance. Therefore with trainer this ability, the students will be able to determine the "weakness" and "strength" has, so that in the end the students can have the ability to overcome the problems faced in everyday life. This is in accordance with the opinion of [AlHouli and Al-Khayatt \(2020\)](#) and [Syaifuddin \(2020\)](#) which states that by applying the assessment, student skill competencies can be measured

The public need information about the assessment criteria can be answered by applying SAS models, because in this SAS model of the assessment criteria for every aspect of the student's performance has been set and similarly about self-assessment. In the model of SAS students assess themselves, both self-assessment and assessment of the results of their performance themselves against participation in the group. Assessment of student' performance results in SAS models, teachers and students both of them provided a score for performance results.

The results of survey study the response of parents as one of the elements in the community, it can be said that people's needs is in accordance with the benefits rather than the model SAS, namely by applying the SAS models in the school, the parents/guardians of students able to: (1) identify the weaknesses and strengths students in learning. This can be achieved, because each performance results achieved by students, the parents make comments/response to the achievements of the son/daughter. Parents have the opportunity to provide motivation and expression of expectations to be achieved; (2) determine kind of guidance to be done by the parents of students for achievement son/daughter, and (3) improvement of communication with the school in educating students.

The questionnaire results of five teachers of science in senior high school Sungguminasa, obtained information that in general teachers do not do the "feedback" to the results of performance (tasks, daily tests, and repeat the semester) their students, sometimes giving information on the assessment criteria, and never give a chance to students to assess themselves against the results of its performance. It means that there is a gap between the needs of the community with the implementation of the system of assessment in schools. Society nowadays need information how the learning progress of students in the school from time to time and in a comprehensive manner, the criteria used in the assessment, and trained students assess themselves, on the other hand it turns out these needs are not fully met.

The survey results mentioned above, this information reinforces the need to develop SAS models questionnaire results from 350 students showed that the suitability of the information contained on the teacher and the information from students, and students in general have a tendency to know the progress of learning results. It means that all the results of student performance over time needs to be informed, so that students can find out how their learning progress. The survey results of laboratory equipment, it still needed some laboratory equipment to support the implementation of SAS models. Laboratory equipment needed are: (1) tools calorimeter; (2) technical balance tool, and (3) expansion tool agent. The equipment is borrowed from physics laboratory, State University of Makassar. This can be realized because of the cooperation between the senior high school Sungguminasa and the University of Makassar. While the means of tables, benches, and laboratory equipments to support the implementation of SAS models. Therefore the form of tables, rectangular practicum students then setting the seating positions facing each other in the student made scientific activities (activities observing and experimenting). From the survey result means seating and tables that show the ingredients lab strongly supports the implementation of SAS models.

4.2. Analysis Curriculum

4.2.1. Analysis Front End

SAS model development is done to enhance the assessment system in cooperative learning and assessment models Hibbard. In the cooperative learning, assessment component is still some weaknesses. The weaknesses include more emphasis on the assessment of learning outcomes achieved by students at the end of the lesson and less emphasis on assessment of student performance results. To complement these weaknesses SAS models then developed a model based on the model assessment Hibbard. However, on the model of Hibbard's assessment there are still some weaknesses that need to be improved, including the absence of a self assessment against the group and there is no element of motivating both teachers and parents/guardians of students. On the other hand, this element is one element that is needed by the community in accordance with the results of surveys that have been described previously.

SAS models development is needed grounding theories were strong and intertwined between the theory and other theories. Based on the results of the literature review obtained several theories that support the development of models of SAS include: (1) understand cognitive; (2) understand constructivist: learning theory Piaget, learning theory Vygotsky, learning theory Bruner, learning theory Polya; (3) learning theory Ausebel; (4) Malmivuori learning theory; (5) theory class assessment: Herman, Ascbacher, and Winter, (6) theory class assessment Webb; (7) the theory of authentic assessment. According to his assessment of education experts and scientific experts who becomes validator in this study stated that these theories are very powerful and interlinked between the theory and other theories. These theories are very eligible as supporting theory in the development of SAS models.

4.2.2. Analysis of Students

The results of the initial analysis of the ability of mastering the concept of temperature and heat of 371 students, obtained information that many concepts of temperature and heat are not yet mastered by the student. It is shown from the results of the initial test material temperature and heat, the average score was only 4.85. There are only two classes who gets an average score above six. Based on this information, the concepts are not yet mastered by the student still needs to be given to the student book.

Students in participating in the implementation of SAS models are divided into groups, each group consisted offivestudents. In this group division wasbased on ability, gender, and type of parts. Information about the ability, gender, and type of tribal students was obtained from the survey results. The data obtained from the student's ability documentation data Certificate of Examination Results. On the distribution of group members based on the theory of the division of Lie groups. The group division based on gender, and type of parts it is possible to do, because based on the data from the survey found that the ratio between the number of female students and male almost as many, nor about the type of clan (Bugis and Makassar tribe).

In this study, in addition to the information level of student ability, gender, and ethnicity are also needed information on the work of parents. The data about the job of parents is needed, because in the implementation of SAS models include aspects of the comments of parents on student achievement that has been accomplished. Based on the survey results, the work of parents/guardians support the implementation of SAS models, because in general the parents/guardians of students have a higher education. It means that all parents/guardians of students able to provide comments / feedback on the performance of their child.

The questionnaire results from 350 students, obtained information that the desire of the parents/guardians of students and students themselves have the same tendency, which both require assessment of learning outcomes of physics in schools is done from time to time and thoroughly (cognitive, affective, and psychomotor), the need for "feedback" immediately, and the assessment criteria used by teachers need to be delivered to students.

4.2.3. Analysis Material

In the analysis phase begins with the material provides the initial test to 390 students. Initial test material is the material temperature and the heat that has been studied by students. This initial test aims to determine the concepts of temperature and heat. Which has not been mastered by the students as a prerequisite to the concepts of temperature and heat the material. Results from this information, as a basis model of SAS software development by incorporating these concepts into their teaching.

Based on the results of this initial test, there are some concepts and understanding of the material and the temperature of heat required to be disclosed in the students' books. Concepts that still need to be "suppression" in the implementation of SAS models are: (1) the concept of temperature; (2) comparative scale thermometer, thermometer function concept, and the concept of the type of liquid in a thermometer; (3) the concept of water anomaly; (4) The heat unit concept, the concept of heat transfer; (5) the concept of specific heat, and the heat capacity; (6) the sense heat of evaporation, condensation understanding, and understanding the melting heat.

The results of the analysis of the structure of the content that was developed based on the contents of Curriculum 2013, in particular temperature and heat the material, it was found that the 2013 science curriculum senior high school is no longer the elaboration of indicators. It means that teachers are required to create indicators and specific learning objectives. Based on this information, it is in the development of learning tools described pembelajaran indicators and objectives specific to each Lesson Plan, and in each of the learning plan comes with authentic assessment sheet. The task analysis was conducted to identify the stages of completion of tasks in accordance with the temperature of the material and heat. Analysis of these tasks include the analysis of the content and concept analysis. The final result of the analysis contained in the task of "student 'performance, and authentic assessment sheet). The results of observations of two observers on the ability of the students in the psychomotor aspects included in the high category with average yield of psychomotor abilities of 91. Similarly, the tasks implemented on SAS models, in the form of task performance which consists of duty to report the results of observations or experiments, in general, students do well, it can be seen from the result of the ability of process skills which the average value of students reached 81 on the pilot phase of 90, the task doing the competency test in general students can do, it can be seen from the average results study on cognitive aspects in pilot phase 90. the task of the students assess themselves against the results of self-assessment of its performance and its participation in the group also generally do well, as seen in the learning outcomes in the affective aspects of 82 on the pilot phase of 90, and when analyzed data from observations of two observers show that all students are engaged in class discussions, conduct cooperation in scientific activities, ask the same friends and teachers, provide ideas. Similarly, data from the questionnaire results in the affective aspect of learning outcomes showed that the results were consistent with the observations and the results of the students' statements within the SAS models, all of which showed average values above 80. It was proved that the learning outcomes of students in a very affective aspects reliable. That is, there is a match between the observer and the statement of the results of a respondent. While the selection task, and the task of reflection also on the subject matter students are generally well done, but the results rather than the student's performance is not analyzed further, because the results of the performance of these tasks is the result of group work done at home. However, that does not mean it has no effect on the motivation of the students, because the value of the group is taken as a reference in awarding the prize to the group. This scenario is delivered to students, so that they are motivated to do the work of the group, both in completing observation or experiment, and perform tasks in the home. The results of the analysis of the information indicates that some of the concepts of temperature and heat that previously have not been mastered by students based on the results of the initial tests (material temperature and heat in Junior high school) at the time participated in the implementation of the model SAS these concepts can already be controlled, which is reflected in the value of the average learning results obtained during the implementation of SAS models by 79 in the test phase at 90. While the average initial test results only 40.

The results obtained from the analysis of the concept of teacher responses indicate that 100 percent of teachers said that the analysis of this concept is very helpful in implementing SAS models. It means that the analysis of the concept is practically implemented in SAS models.

4.3. SAS Models Validation Results

Data content includes the validation results supporting theories SAS models development and validation constructs include constructs linkages between components of SAS models in the category of valid and fit for use. The results of the validation content and construct models of the SAS in [Table 5](#) and [6](#).

Table 5.Dataofvalidity results module science authentic assessmentcontent.

No	Rated aspect	Theaverage aspect Ai
1.	Supporting theory model of science authentic assessment	4.1
2.	Step-by-step implementation model of science authentic assessment	3.9
3.	The social system in the implementation model of science authentic assessment	3.9
4.	The principle of the model management reaction science authentic assessment	4.0
5.	SAS models support system implementation	3.9
6.	Impact of the implementation and impact of the model companion science authentic assessment	4.0
7.	Implementation of the model of science authentic assessment	4.1
8.	The learning environment and management duties science authentic assessment models	3.8
9.	science authentic assessment models evaluation	3.9
	The average total (VR) = 3.9	

Note: Ai is the average of the results of validitymodule science authentic assessment content.

4.4. Expert Commentary

Rate in general expert states that the theories that support the development of authentic assessment science is very solid and intertwined among the theories described in SAS models. The suggestions of the expert of which is in the handbook and supplements SAS models should be made more compact (without reducing essential things) that have high readability and acceptability. All devices are generally decent SAS models used in the field for data retrieval research. Revisions to the book model of SAS on the criteria for assessment of the results of scientific activity, namely criteria: create questions, formulate problems, make hypotheses, create tables, create graphics, reading charts, making predictions, designing experiments (formulate variable manipulation, response variables, control variables, manipulation variable definition, the definition of control variables) and make inferences.

Table 6. Data of validityresults construct components science authentic assessmentmodel.

No	Rate aspects	The average aspects Ai
1.	science authentic assessment model components	3.9
2.	science authentic assessment models support the theory	4.1
3.	Step-by-step implementation of science authentic assessment models	3.8
4.	The social system in the implementation of science authentic assessment models	3.8
5.	Reaction principle management science authentic assessment models	3.9
6.	science authentic assessment models	3.8
7.	the implementation Bridesmaids science authentic assessment models	3.6
8.	Implementation of science authentic assessment models	4.1
9.	The learning environment and management duties models science authentic assessment	3.7
10.	science authentic assessment model evaluation	4.3
	The average total (VR) = 4.2	

Note: Ai is the average of the results of validityconstruct components science authentic assessment model.

4.5. Expert Commentary

In general, states that the link expert contents of the components of SAS models are interrelated and do not find any contradiction between what the contents of the book with the device SAS models. Comments and suggestions from the expert including SAS models guidebook packed with modern learning theory is very relevant to the central theme of research. The handbook should be made more compact, attractive and avoid some mistakes topography.Data validation results SAS model development support device consisting of [Table 6](#): planning for learning; [Table 7](#): task authentic assessment; [Table 8](#): result validity assessment authentic

supplement, [Table 9](#): guidelines for teachers; [Table 10](#): guidelines for students, and [Table 11](#): book of students all supporting devices in the category of valid and fit for use.

Table 7. Lesson planning data validity results.

No.	Rate aspects	The average aspects Ai
1	Indicator	3.9
2	The contents of the subject matter	4.0
3	Language	3.8
4	Time	3.9
5	Teaching methods	3.7
6	Learning closed	3.9
Average total (VR) = 3.8		

Note: Ai is the average of the results of validity Lesson planning.

Table 8. Date of validity result student' activity sheet.

No	Rate aspects	The average aspects Ai
1	Organisation	4.0
2	Prosedure	3.7
3	Question/problem	3.7
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity student' activity sheet.

Table 9. Date of validity result authentic assessment suplement.

No.	Rate aspects	The average aspects Ai
1	Organisation	3.9
2	Prosedure	3.9
3	Question/problem	3.9
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity authentic assessment suplement.

Table 10. Data of validity results teacher manual.

No	Rate aspects	The average aspects Ai
1.	Introduction	3.9
2.	Science problem representation	4.2
3.	Learning method	3.8
4.	Learning closed	3.9
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity teacher manual.

Science achievement test consisting of a test product, scientific knowledge tests, and performance tests at tested to 43 students. The test consists of 24 items of products, after testing produced 23 items that valid and an invalid item. The tests show that the contents of the item 23 to be able to represent all the material temperature and heat with the level of reliability 0.99. Scientific knowledge test consists of 23 items, after testing produced 23, is 0.99. The performance test of 10 items, after testing produced is 0.72.

4.6. Effectiveness of Models SAS

[Table 11](#) shows the results of teacher feedback on the effectiveness of the implementation of SAS models. The teachers in assessing the effectiveness of using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high, 5 is very high.

[Table 12](#) presents Data validity results student book.

Table 11. Data of validity results student manual.

No	Rate aspects	The average aspects Ai
1	Sub organization concept	3.6
2	Translation of troubleshooting steps temperature and heat	3.9
3	Activity	4.4
4	Learning closed	4.2
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity student manual.

Table 12. Data validity results student book.

No	Rate aspects	The average aspects Ai
1	Translation of material	3.9
2	Construction	3.9
3	Exercise	4.0
Average total (VR) = 3.9		

Note: Ai is the average of the results of validity student book.

Table 13 presents Data on the effectiveness of the authentic assessment science models.

Table 13. Data on the effectiveness of the authentic assessment science models.

No	Rate aspects	The average aspects Ai
1	Student learning outcomes	4.1
2	Student response against components and implementation Process science authentic assessment models	4.1
Average total (VR) = 4.1		

Note: Ai is the average of the results of effectiveness science authentic assessment models.

4.7. Practicality of Models SAS

Table 14, shows the practicality of the model based on the observation SAS with implementation SAS models support device.

Table 14. Data on implementation of supporting device for science authentic assessment model.

No	Rate aspects	The average aspects Ai
1	Measures implementation of science authentic assessment models	3.1
2	Social systems implementation of science authentic assessment models	3.9
3	Reaction principle management science authentic assessment models	3.8
IO value or value average total (VR) = 3.6		

Note: Ai is the average of the results of implementation of supporting device for science authentic assessment model.

Remarks:

IO is intended \Leftrightarrow Operational

Science achievement test scores found that the level of student mastery (LSM) of the subject matter of science high 90 and 100 percent of students completed. Students' response to the implementation of science authentic assessment models is a slight positive, according to the teacher's response to the ease of implementing science authentic assessment models is positive.

Table 15. Data of comments student questionnaire response to the question on of science authentic assessment.

No.	Comment	
	First question	The second question
1	Yes, because all of a language that is very easy to understand	Yes, because in the book student, student worksheet, student manual, and supplements science authentic assessment already written clearly accompanied by images that can allow me to learn.
2	Yes, the explanation of the book student, student worksheet, student manual, and supplements science authentic assessment easy to understand and clear explanation	Yes, because the appearance of such a book students, student worksheet, student manual, and supplements science authentic assessment students will be more interested in reading and with their images with easy to understand explanations.
3	Yes, because the language used is the language and its standard sentence too short and clear so easy to understand.	Yes, because with the article with pictures easier for students to understand the intent rather than the text.
4	Yes, I can understand the language used in the book student, student worksheet, student manual, and supplements science authentic assessment	Yes, because if the appearance of text, large font, image, layout and color pictures in books student, student worksheet, student manual, and supplements science authentic assessment, the learning atmosphere we will not boring and happy doing his work.

Table 15 following several students comment on questions related to the implementation of SAS models support device.

9. Are you able to understand the language used in the book Student, Student Worksheet, Student Manual, and supplements science authentic assessment?
10. Are you interested in the appearance (text, large font, image, layout images, colors) books Student, Student Worksheet, Student Manual, and supplements science authentic assessment?

Table 16. Expert response data regarding the implementation of science authentic assessment model.

No	Aspects observed and judged	Average aspect Ai
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation model of science authentic assessment	4.2
3	Principle reaction models management science authentic assessment	4.3
Average total = 4.2		

Note: Ai is the average of the results of expert responses regarding the implementation of science authentic assessment model.

Table 16, shows the results of the responses of six education experts regarding enforceability of SAS models theoretically in the field. Educational experts in assessing the enforceability of SAS models in the classroom by using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high; 5 is very high.

Table 17, enforceability of data models in a class derived from the observation of two (2) people watchers. Observers in observing the implementation of SAS models during seven meetings using assessment scores: 1 is very low; 2 is low; 3 is sufficient; 4 is high; 5 is very high.

Ratings among experts on the implementation of SAS models is theoretically consistent with the observation observer SAS model implementation in the classroom 4.2 it indicates that that the application of SAS models in practical classes.

Table 17. Observation result data on the implementation of the science authentic assessment models.

No	Aspects observed and judged	Average aspect Ai
1	science authentic assessment models implementation procedures	4.2
2	Social system implementation models of science authentic assessment	4.3
3	Principle reaction models management science authentic assessment	4.2
Average total = 4.2		

Note: Ai is the average of the results of observation on the implementation of science authentic assessment model.

5. DISCUSSION AND CONCLUSION

5.1. Discussion

The analysis of the validity and practicality found that SAS models support device is valid criteria and practical criteria applied in assessing student competence. Student competency can be assessed in a comprehensive and sustainable. Muho and Taraj (2022) found that formative assessment practices affect students' motivation in learning English.

Student learning outcomes include cognitive aspects (products and processes), affective, and psychomotor aspects obtained from the authentic supplement the assessment indicates that results for students in the pilot phase already meets the standards of competence specified achievement. This is caused because all the planning done well. Similarly, the results obtained from the student learning achievement test at the end of the implementation of the model. This means that the device is SAS models meet the criteria effectiveness. Chi, Xiu, and Zuhao (2021) conducted a study related to comparing student science, found for participants.

Results of student and teacher responses to the components and implementation of SAS models show a positive response. It shows that in the aspect of student and teacher responses to the components and implementation of SAS models meet the criteria of effectiveness. That is, the entire device is SAS models support the implementation of learning in the classroom is expected that students will be more motivated to learn science.

Based on the results of this questionnaire are generally teachers found the necessary and feasible SAS models developed on the subject of how to do more with the device making training and accompanied by the provision of laboratory equipment in accordance with the required media in the implementation of the SAS models. Similarly, the teacher stated that the strategy of implementation of SAS models can be used as a primary strategy in learning science. Vahidnia, Behzad, and Hesamoddin (2021) and Fauzan et al. (2013) also

developed and validated an instrument of student attitudes towards teachers to find differences in the level of student attitudes

Both results are very appropriate response to the comments of experts based on their knowledge and experience theoretically. It proved empirically SAS model implementation in the field which is derived from the observation of two (2) observers indicate that the average yield assessment scores of both observers in the high category and reliable. Thus, it can be said that the implementation of SAS models is theoretically supported by empirical data in the field with high reliability. That is, the implementation of SAS models although observed by different people and different conditions will give consistent results. Toma (2021) developed Instrument and psychometric evaluation

Teachers initially still faces obstacles in implementing SAS models, it is because, as a model system SAS is a form of assessment and learning system innovation. As it like an innovation, then the SAS models requires a shift in perspective from teachers, the community, including a shift in perspective parents. Changing the way it is not an easy task, but requires hard work and commitment. Teachers are required to be able to pay attention to individual students, monitor progress, encourage them more activity, collecting every student work to be comments, and so forth. All it requires extra time and effort. Therefore, teachers lack strong motivation in their profession, it would be difficult to implement this SAS models. The difference between this study and that developed by Chi et al. (2021) and Matsumoto-Royo and Ramírez-Montoya (2021) and Wong et al. (2022) is only Instrument Knowledge development.

In the next phase, the teachers have been able to overcome the obstacles perceived in the early stages. Teachers, giving students the opportunity to assess themselves to the task with a friend based on the guidelines assessment authentic. Teachers keep checking on the results of this self-assessment. The impact than self assessment is that it will foster honesty of students in doing the job. SAS Models has some weaknesses in the implementation of the class are: (1) due to the limitations of the researcher, only two observers to observe social skills, psychomotor skills of students, and enforceability of SAS models. This is done with the consideration that if the use of many observers, it can affect the process of implementation of SAS models in the classroom; (2) observation of social skills, and psychomotor skills performed in all groups. This is done with the consideration that social skills and psychomotor skills a person can not be sampled for other people. All information to assess social skills and psychomotor skills, then observations were made only one group at each meeting. Since a lot of meetings in the implementation of SAS models as much as seven meetings either at trial. The disadvantage of this observation is the observation frequency becomes a little bit, but the excess all students accessed.

5.2. Conclusion

Conclusions of this study resulted in SAS models qualified products meet the criteria of validity; practicality and effectiveness. The results of students in the high category and the response of students and teachers on the implementation of positive SAS models. This is in accordance with the opinion of Wieth-Korprich and Sandra (2017) and Toma (2021); Suwartono and Riyani (2019) which states that by applying the assessment, students' knowledge competence can be measured (Setyawarno & Kurniawati, 2018) and Sutarto and Jaedun (2018).

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REFERENCES

- Agus, K., & Suprianti, G. A. P. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Aiken, L. R. (2013). *Psychological tests and evaluation*. Mexico: Pearson.
- AlHouli, A. I., & Al-Khayatt, A. K. A. (2020). Assessing the soft skills needs of teacher education students. *International Journal of Education and Practice*, 8(3), 416-431. <https://doi.org/10.18488/journal.61.2020.83.416.431>
- Centoni, M., & Antonello, M. (2021). Students' evaluation of academic courses: An exploratory analysis to an Italian case study. *Studies in Educational Evaluation*, 70, 101054. <https://doi.org/10.1016/j.stueduc.2021.101054>
- Chakraborty, S., Dann, C., Mandal, A., Dann, B., & Paul, M. (2021). Effects of rubric quality on marker variation in higher education. *Studies in Educational Evaluation*, 70, 100997. <https://doi.org/10.1016/j.stueduc.2021.100997>
- Chi, S., Xiu, F. L., & Zuhao, W. (2021). Comparing student science performance between hands-on and traditional item types: A many-facet Rasch analysis. *Studies in Educational Evaluation*, 70, 100998. <https://doi.org/10.1016/j.stueduc.2021.100998>

- Fauzan, A., Plomp, T., & Gravemeijer, K. (2013). The development of an RME-based geometry course for Indonesian Primary schools. In T. Plomp, & N. Nieveen (Eds.), *Educational design research - Part B. Illustrative cases*. In (pp. 159-178). SLO: Netherlands Institute for Curriculum Development.
- Fynn, A., & Elias, O. M. (2022). Continuous online assessment at a South African open distance and e-learning institution. *Frontiers in Education Original Research*, 27(79), 1-13. <https://doi.org/10.3389/feduc.2022.791271>
- Huizinga, T., Handelzalts, A., Nieveen, N., & Voogt, J. M. (2014). Teacher involvement in curriculum design: Need for support to enhance teachers' design expertise. *Journal of Curriculum Studies*, 46(1), 33-57. <https://doi.org/10.1080/00220272.2013.834077>
- Inayah, N., Komariah, E., & Nasir, A. (2019). The practice of authentic assessment in an EFL speaking classroom. *Studies in English Language and Education*, 6(1), 152-162. <https://doi.org/10.24815/siele.v6i1.13069>
- Kurniawati, A., & Sukardiyono, S. (2018). The development of authentic assessment instrument to measure science process skill and achievement based on students' performance. *Journal of Physics Education Research & Development*, 4(2), 65-74. <https://doi.org/10.21009/1.04203>
- Matsumoto-Royo, K., & Ramírez-Montoya, S. M. (2021). Core practices in practice-based teacher education: A systematic literature review of its teaching and assessment process. *Studies in Educational Evaluation*, 70, 101047. <https://doi.org/10.1016/j.stueduc.2021.101047>
- Miller-Young, J., Marin, L. F., Poth, C., Vargas-Madriz, L. F., & Xiao, J. (2021). The development and psychometric properties of an educational development impact questionnaire. *Studies in Educational Evaluation*, 70, 101058. <https://doi.org/10.1016/j.stueduc.2021.101058>
- Mohamed, R., & Lebar, O. (2017). Authentic assessment in assessing higher order thinking skills. *International Journal of Academic Research in Business and Social Sciences*, 7(2), 466-476.
- Mongkuo, M. Y., & Mongkuo, M. Y. (2017). Testing the factorial equivalence of the collegiate learning assessment performance task diagnostic instrument across lower class and upper class predominantly black college students. *International Journal of Education and Practice*, 5(6), 95-103. <https://doi.org/10.18488/Journal.61.2017.56.95.103>
- Moria, E., Refnaldi, R., & Zaim, M. (2017). *Using authentic assessment to better facilitate teaching and learning: The case for students' writing assessment*. Paper presented at the Sixth International Conference on Languages and Arts (ICLA 2017). Atlantis Press.
- Muho, A., & Taraj, G. (2022). Impact of formative assessment practices on student motivation for learning the English language. *International Journal of Education and Practice*, 10(1), 25-41. <https://doi.org/10.18488/61.v10i1.2842>
- Salirawati, D. (2021). Authentic assessment in the pandemic period. *Journal of The Indonesian Society of Integrated Chemistry*, 13(1), 21-31.
- Setyawarno, D., & Kurniawati, A. (2018). Implementation of authentic assessment in science learning at Indonesian schools. *Journal of Science Education Research*, 2(2), 47-55.
- Sholihah, M. (2021). Authentic assessment in online learning during the covid-19 pandemic. *Edunesia: Scientific Journal of Education*, 2(2), 576-580.
- Suarimbawa, K. A., Marhaeni, A., & Suprianti, G. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Susani, R. (2018). The implementation of authentic assessment in extensive reading. *International Journal of Education*, 11(1), 87-92.
- Sutarto, H. P., & Jaedun, M. P. D. (2018). Authentic assessment competence of building construction teachers in Indonesian vocational schools. *Journal of Technical Education and Training*, 10(1).
- Suwartono, T., & Riyani, C. (2019). Authentic assessment in ELT: Hopes, challenges, and practices. *Reflection on Education: Scientific Journal of Education*, 9(2).
- Svidzinskaya, G. B., Baskin, Y. G., & Mezentseva, M. E. e. (2019). Using the Semantic Differential Method to Assess the Learning Motivation and Attitude of First-Year Students towards Chemistry in University of EMERCOM of Russia. *International Journal of Education and Practice*, 7(2), 88-100.
- Syaifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*, 9(4), 1491-1502. <https://doi.org/10.12973/eu-jer.9.4.1491>
- Toma, B. R. (2021). Measuring children's perceived cost of school science: Instrument development and psychometric evaluation. *Studies in Educational Evaluation*, 70, 101009. <https://doi.org/10.1016/j.stueduc.2021.101009>
- Vahidnia, F., Behzad, G. H., & Hesamoddin, S. (2021). Development and validation of students' attitudes towards teacher's pet phenomenon scale in the higher education setting: Differences by levels of study and grade-point-average. *Studies in Educational Evaluation*, 70, 101000. <https://doi.org/10.1016/j.stueduc.2021.101000>
- Veugen, M. J., Gulikers, J. T. M., P., & Brok, D. (2021). We agree on what we see: Teacher and student perceptions of formative assessment practice. *Studies in Educational Evaluation*, 70, 101027. <https://doi.org/10.1016/j.stueduc.2021.101027>
- Wiethe-Korprich, M., & Sandra, B. (2017). Prospective educators as consumers of empirical research: An authentic assessment approach to make their competencies visible. *Empirical Research in Vocational Education and Training*, 9(8), 2-26. <https://doi.org/10.1186/s40461>
- Wong, K. K., Bajwa, T., & Fienup, D. M. (2022). The application of mastery criterion to individual operants and the effects on acquisition and maintenance of responses. *Journal of Behavioral Education*, 31(3), 461-483. <https://doi.org/10.1007/s10864-020-09420-3>



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Authentic assessment development science to assess student competency

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ABSTRACT

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Keywords

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This study aimed to examine authentic models of science assessment in assessing the competence of senior high school students who met the criteria of validity, practicality, and effectiveness. The methodology applied was an evaluation and developmental research. Research was conducted in senior high school in accordance with the needs of the development of authentic Statistical Analysis System (SAS) models. The participants were students of class X senior high school Gowa in South Sulawesi academic year 2020/2021. The instruments comprised (1) SAS model validation sheet; (2) science achievement test; (3) questionnaires; and (4) observation sheet. The findings of the quality authentic science assessment model met the validity and effectiveness criteria for high category learning outcomes with positive student responses. The practicality implications of the SAS model were also very worthy of applied science in teaching science for assessing the competence of senior high school students.

Contribution/Originality: The contribution of this research is having developed Statistical Analysis System (SAS) as an authentic science assessment model for qualified products that meet the criteria of validity, effectiveness and practicality.

1. INTRODUCTION

Teachers view assessment as continuous, interrelated and strongly integral part of learning process. Paper and pencil tests are the only evaluation tools carried out in learning so that all student competencies cannot be measured (AlHouli & Al-Khayatt, 2020; Kurniawati & Sukardiyono, 2018; Mohamed & Lebar, 2017; Mongkuo & Mongkuo, 2017; Susani, 2018; Suwartono & Riyani, 2019). If they are authentic assessment methods, they can measure all student competencies (Inayah, Komariah, & Nasir, 2019; Moria, Refnaldi, & Zaim, 2017; Setyawarno & Kurniawati, 2018).

2. THEORETICAL FRAMEWORK

2.1. Authentic Assessments

Authentic assessments are made in complex situations (Centoni & Antonello, 2021; Moria et al., 2017; Salirawati, 2021; Suarimbawa, Marhaeni, & Suprianti, 2017; Sutarto & Jaedun, 2018; Wiethe-Korprich & Sandra, 2017). Authentic assessment of educational achievement directly measures actual performance in the subject area. A

few studies (Fynn & Elias, 2022; Sholihah, 2021; Sutarto & Jaedun, 2018) show how students' assessment is done. Students can demonstrate that complex skills are difficult to be assessed through paper and pencil tests and require authentic assessments techniques (Aiken, 2013), as shown in Table 1. A framework of organizing authentic assessments is shown in Figure 1 based on Carin (2017), and Agus and Suprianti (2017).

Table 1. Techniques of authentic assessments.

Complex skills that require authentic assessments techniques	
Planning and carrying out experiments	Creating graph data
Writing stories, essays, poetry	Creating the chart
Giving oral reports	Noting the observations
Being a peer tutor	Asking question
Creating a journal	Improvise
Interviewing informants	Creating computer programs
Being a local travel guide	Searching for information in the library and etc.
Correspond with science authors	Completing the literature review

Source: Aiken (2013).

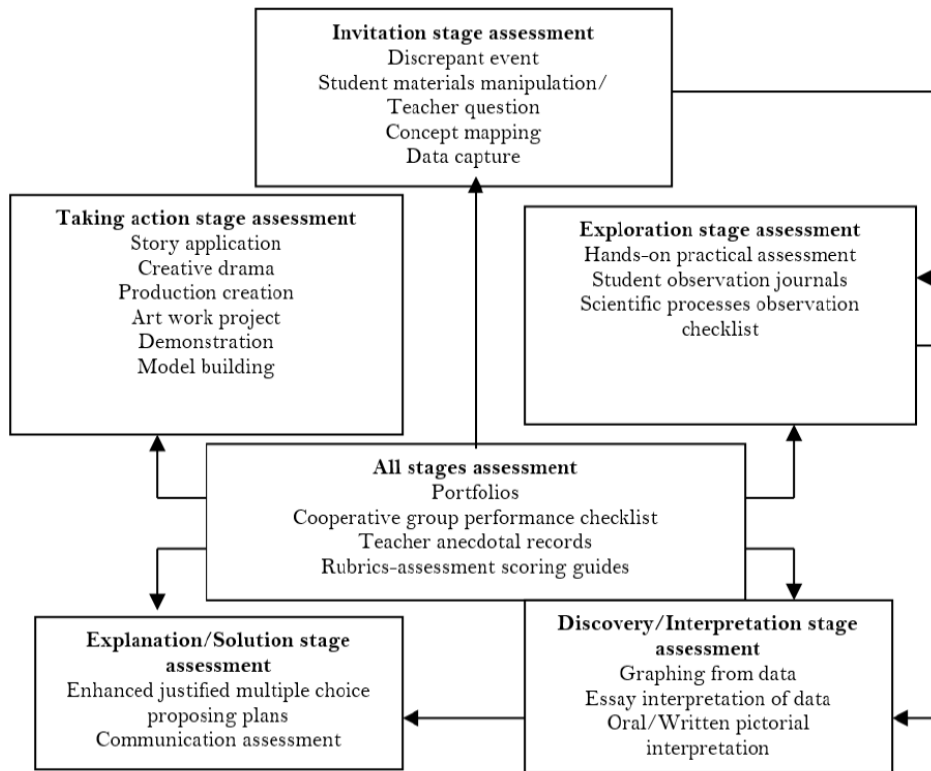


Figure 1. Authentic assessments organization in the learning cycle stage.

Source: Carin (2017) and Agus and Suprianti (2017).

2.2. Implementation of Authentic Assessment

Implementation of authentic assessment at each stage can be described in following four stages (Kurniawati & Sukardiyono, 2018):

1. Invitational Stage

Authentic assessments aimed to obtain information about the initial understanding of the students on a particular topic or concept. The technique used, among others, included asking questions orally or in teacher-

oriented writing to provoke students' opinions, and presenting photos or illustrations that demonstrate a process or a particular situation.

2. Exploration Stage

In this stage, assessment aims to explore the ability of science process skills in students. Assessment techniques may be hands-on/minds-on activity including the assessment of student activities and student observation journal.

3. Explanation Stage

In this stage, authentic assessment is done on the competence of students in observation, analysis, and communication.

4. Action Stage

This is the final stage when assessment aims to uncover the student's ability to apply his understanding of a concept in other situations. The resulting product can be student demonstrations, role playing, oral or written communications, handicrafts, and others.

3. METHOD

3.1. Type of Research

This research is categorized as developmental research, as it contributes to the development of authentic assessment models or Statistical Analysis System (SAS) models and instruments required. SAS has been accepted and recognized as a software system for data analysis and report writing. It helps to store data values and retrieve them, modify data, compute simple and complex statistical analyses, and create reports. In the development research, SAS models are qualified in determining validity, practically, and effectiveness.

3.2. Research Sites

This research was conducted at a senior high school in Gowa in South Sulawesi, in accordance with the needs of development research and application of SAS models.

3.3. Participants

The subjects were the students of class X senior high school at Gowa in South Sulawesi, in the academic year of 2020/2021. The sample size of research subjects in the test phase was 350 students who participated in a questionnaire survey.

3.4. Development Operational

Operationally the development of SAS models is done simultaneously, so when the validity of the model SAS criteria is not met, revising the devices (partially or completely) is done simultaneously with the help of SAS models support devices and related instruments. Simultaneously, the plan of teaching and performance assessment tasks and rubrics are also prepared. Operational development of authentic models of science assessment is shown in Figure 2.

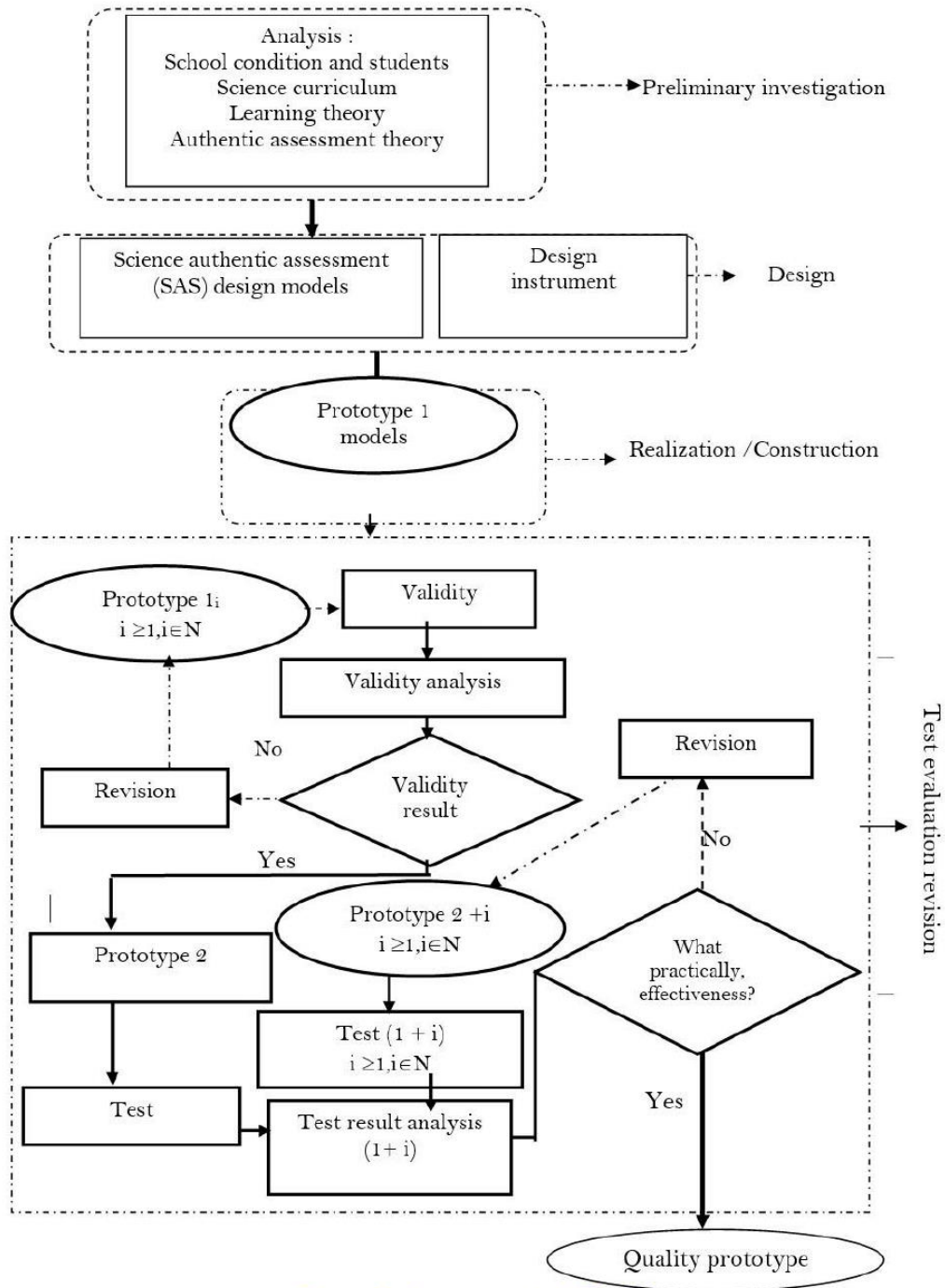


Figure 2. Development operational SAS models.

Remarks:

- : Activity process
- ◇ : Requirement results
- ▭ (dashed) : Development operational
- (solid) : Main flow
- : Activity results
- - -> : Needs if cyclic process

3.5. Instrument

The instruments consisted of (1) SAS models validation sheet; (2) science achievement test; (3) questionnaire; and 4) the observation sheet. These instruments were validated by five experts associated with the evaluation and validation of the content of the construct validation. The tests showed that these instruments were eligible for use in research.

3.6. Data Analysis

Data analysis included quality principles like validity, practicality, and effectiveness as recommended in (Huizinga, Handelzalts, Nieveen, & Voogt, 2014) and Veugen, Gulikers, and Brok (2021), as shown in Table 2.

Table 2. Quality principles

Quality aspects		
Validity	Practicality	Effectiveness
Intended (Idea+ Formal)	Consistency between	Consistency between
-State of the art knowledge	-Intended ↔ Perceived	Intended ↔ Experiential
-Internally consistent	- Intended ↔ Operational	Intended ↔ Attained

The criteria for the categorization of quality SAS models were taken from Bloom, (Fauzan, Plomp, & Gravemeijer, 2013) with the following steps.

a. Calculate average results of the validation of formula $k_i = \frac{\sum_{j=1}^n V_{ji}}{n}$ with k_i = average, the results

b. Calculate average of formula $A_i = \frac{\sum_{j=1}^n k_{ij}}{n}$

kij: Average sub-aspect to j

n: The number aspect sub-aspects of the aspects of the i-th

c. Calculate for a mean total (VR) with the formula $VR = \frac{\sum_{j=1}^n A_i}{n}$,

Table 3 presents the Validity of the SAS model (Chakraborty, Dann, Mandal, Dann, & Paul, 2021).

Table 3. Validity of the SAS model (Chakraborty et al., 2021).

Interval score	Validity criteria
4 ≤ VR ≤ 5	Very high
3 ≤ VR < 4	High
2 ≤ VR < 3	Less
1 ≤ VR < 2	Low

Note: VR is the average total of the results of the assessment of experts, practitioners, and observers.

A data analysis and students' response to the implementation of supporting components of SAS models and data from questionnaires determine the positive response, meaning that students support, feel happy, and are interested in the components and the learning process through the implementation of SAS models. A negative response otherwise determines the achievement of the objectives of the activity implementation of SAS models in

terms of the students' responses. This is the degree of achievement of competence is the percentage of student mastery of the content and performance of the basic competencies of 80% of the basic competencies that have been set can be achieved. According to (Wong, Bajwa, & Fienup, 2022), a program of teaching and learning activities otherwise is very effective, to reach benchmark reference value set beforehand. Since the matter refers to the indicators, the values obtained by the students representing the student's mastery of the indicator is represented by the question, so that the control indicators can be expressed as the total value obtained by the students.

The criteria to achieve mastery learning with application of SAS models are a minimum score 80 (maximum 100) and interval score determining the level of student mastery (LSM) as categorized in Table 4.

Table 4. Criteria for level students' mastery (LSM).

Interval score	Category
$90 \leq \text{LSM} \leq 100$	Very high
$80 \leq \text{LSM} < 90$	High
$70 \leq \text{LSM} < 80$	Less
$60 \leq \text{LSM} < 70$	Low
$0 \leq \text{LSM} < 60$	Very low

Note: LSM is the average of the results of the level of student mastery of experts, and practitioners.

4. RESULTS

4.1. Needs Analysis

As said earlier, parents and the community at large want information on the progress of the learning progress of students from time to time and comprehensively, namely the development in cognitive, affective, and psychomotor aspects. This trend indicates that the conventional, marking system "paper and pencil test" (written test), conducted in schools during this time should be time takes a form of alternative assessment and a complementary system of written test. Written tests cannot assess all students' abilities, on the other hand people have a tendency to get information about cognitive, affective, and psychomotor aspects Svidzinskaya, Baskin, and Mezentseva (2019) and Miller-Young, Marin, Poth, Vargas-Madriz, and Xiao (2021), as by applying the assessment of these aspects, they wish to measure student's attitude and competence. The assessment system that can address these needs of community is the SAS model, that has a philosophy of continuous assessment. The philosophy of this model states that if people want a complete profile of students, they must be photographed from all sides, not only in terms of cognitive, but affective, and psychomotor aspects as well. These three aspects are absolutely developed simultaneously, as required in the curriculum of 2013.

The results of this survey also found some interesting information. First, in general, people wish that the assessment criteria used in the school should be communicated to students. It means that the assessment criteria used in assessing performance results (assignments, papers, daily tests) in school should be delivered to students. Second, the public generally believe that students need to be included in assessing performance outcomes, it means that the community wants that students need to be trained to assess themselves against the results of their performance. Therefore, being an assessor of their own ability, students will be able to determine the "weakness" and "strength", so that in the end they can have the ability to overcome the problems faced in everyday life. This is in accordance with the opinion of AlHouli and Al-Khayatt (2020) and Syaifuddin (2020) which stated that by applying the self-assessment techniques, student skill competencies can be measured.

4.2. Curriculum Analysis

The results of the analysis of the structure of the content was developed based on the contents of Curriculum 2013, in particular. It was found that the 2013 science curriculum senior high school was no longer the elaboration of indicators. It meant that teachers were required to create indicators and specific learning objectives in the

curriculum. Based on this information, it is in the development of learning tools described indicators and objectives specific to each Lesson Plan, and in each of the learning plan comes with authentic assessment sheet. The task analysis was conducted to identify the stages of completion of tasks in accordance with the material. The tasks implemented on SAS models, in the form of task performance which consists of duty to report the results of observations or experiments, in general, students do well, it can be seen from the result of the ability of process skills which the average value of students.

In curriculum tests, the tasks of the competency test in general which students can do, were seen from the average results study on cognitive aspects. The tasks of students assessing themselves against the results of self-assessment of its performance and its participation in the group were also seen in the learning outcomes in the affective aspects. Similarly, data from the questionnaire results in the affective aspect of learning outcomes showed that the results were consistent with the observations and the results of the students' statements within the SAS models, all of which showed average values. It was proved that the learning outcomes of students in a very affective aspects are reliable. That is, there is a match between the observer and the statement of the results of a respondent.

In the selection task, and the task of reflection also on the subject matter students generally perform well, but the results rather than the student's performance is not analyzed further. The results of the performance of these tasks is the result of group work done at home. However, that does not mean it has no effect on the motivation of the students, because the value of the group is taken as a reference in awarding the prize to the group. This scenario is delivered to students, so that they are motivated to do the work of the group, both in completing observation or experiment, and perform tasks in the home. The results of the analysis of the information indicates that some of the concepts of temperature and heat that previously have not been mastered by students were based on the results of the initial tests (on material temperature and heat in Junior high school). Students at the time had participated in the implementation of the model SAS and these concepts were already controlled, which is reflected in the value of the average learning results obtained during the implementation of SAS models.

The results obtained from the analysis of the concept of teacher responses indicate that 100 percent of teachers said that the analysis of this concept was very helpful in implementing SAS models. It means that the analysis of the concept was practically implemented in SAS models.

4.3. SAS Models: Validity Results

Data content of this study included the validation results supporting theories SAS models development and validation constructs include constructs linkages between components of SAS models in the category of valid and fit for use. The results of the validation content and construct models of the SAS are shown in Table 5 and 6.

Table 5. Data of validity results module science authentic assessment content

No	Rated aspect	Average aspect*
1.	Supporting theory model of science authentic assessment	4.1
2.	Step-by-step implementation model of science authentic assessment	3.9
3.	The social system in the implementation model of science authentic assessment	3.9
4.	The principle of the model management reaction science authentic assessment	4.0
5.	SAS models support system implementation	3.9
6.	Impact of the implementation and impact of the model companion science authentic assessment	4.0
7.	Implementation of the model of science authentic assessment	4.1
8.	The learning environment and management duties science authentic assessment models	3.8
9.	Science authentic assessment models evaluation	3.9
Average total = 3.9		

Note: *Average aspect is the average of the results of validity module in all science authentic assessment content.

Table 6. Data of validity results construct components science authentic assessment model.

No	Rated aspects	Average aspects*
1.	Science authentic assessment model components	3.9
2.	Science authentic assessment models support the theory	4.1
3.	Step-by-step implementation of science authentic assessment models	3.8
4.	The social system in the implementation of science authentic assessment models	3.8
5.	Reaction principle management science authentic assessment models	3.9
6.	Science authentic assessment models	3.8
7.	The implementation bridesmaids science authentic assessment models	3.6
8.	Implementation of science authentic assessment models	4.1
9.	The learning environment and management duties models science authentic assessment	3.7
10.	Science authentic assessment model evaluation	4.3
The average total (VR) = 4.2		

Note: *Average aspects is the average of the results of validity construct components science authentic assessment model.

In general, states that the link expert contents of the components of SAS models are interrelated and do not find any contradiction between what the contents of the book with the device SAS models. Comments and suggestions from the expert including SAS models guidebook packed with modern learning theory is very relevant to the central theme of research. The handbook should be made more compact, attractive and avoid some mistakes topography. Data validation results of SAS model development support device are presented in Table 7: planning for learning; Table 8: task authentic assessment; Table 9: validity assessment authentic supplement, and Table 10: guidelines for teachers (teachers manual).

Table 7. Data of validity results for planning of learning.

No.	Rate aspects	Average aspects*
1	Indicator	3.9
2	The contents of the subject matter	4.0
3	Language	3.8
4	Time	3.9
5	Teaching methods	3.7
6	Learning closed	3.9
Average total (VR) = 3.8		

Note: *Average aspect is the average of the results of planning for learning.

Table 8. Data of validity results for task authentic assessment.

No	Rate aspects	Average aspects*
1	Organization	4.0
2	Procedure	3.7
3	Question/problem	3.7
Average total (VR) = 3.9		

Note: *Average aspect is average of the results of task authentic assessment

Table 9. Data of validity results for authentic assessment supplement.

No.	Rate aspects	Average aspects*
1	Organization	3.9
2	Procedure	3.9
3	Question/Problem	3.9
Average total (VR) = 3.9		

Note: *Average aspects is the average of the results of authentic assessment supplement.

Table 10. Data of validity results for teacher manual.

No	Rate aspects	Average aspects*
1.	Introduction	3.9
2.	Science problem representation	4.2
3.	Learning method	3.8
4.	Learning closed	3.9
Average total (VR) = 3.9		

Note: *Average aspects is the average of the results of teacher manual.

Science achievement tests consisted of a test product, scientific knowledge tests, and performance tests. Each test consisted of 24 items of products initially, but after testing one item was found invalid, so there were 23 items. These 23 items represented all the material temperature and heat with the level of reliability 0.99. The performance test of 10 items, after testing produced was 0.72, within the prescribed limits.

4.4. SAS Models: Effectiveness Results

Table 11 shows the results of teacher feedback on the effectiveness of the implementation of SAS models. The assessment scores to test effectiveness were: 1 very low; 2 low; 3 sufficient; 4 high; 5 very high. Table 12 presents data effectiveness results on student book of supporting devices.

Table 11. Teacher feedback on the effectiveness of the implementation of SAS models in student manual.

No	Rate aspects	Average aspects*
1	Sub organization concept	3.6
2	Translation of troubleshooting steps temperature and heat	3.9
3	Activity	4.4
4	Learning closed	4.2
Average total (VR) = 3.9		

Note: *Average aspects is the average of the results of effectiveness of the implementation of SAS models in student manual.

Table 12. Data of effectiveness on student book of supporting devices.

No	Rate aspects	Average aspects*
1	Translation of material	3.9
2	Construction	3.9
3	Exercise	4.0
Average total (VR) = 3.9		

Note: *Average aspects is the average of the on student book of supporting devices

Table 13 presents data on the effectiveness of the authentic assessment science models.

Table 13. Data of effectiveness results of the authentic assessment science models.

No	Rate aspects	Average aspects*
1	Student learning outcomes	4.1
2	Student response against components and implementation Process science authentic assessment models	4.1
Average total (VR) = 4.1		

Note: *Average aspects is the average of the results of effectiveness science authentic assessment models.

4.5. SAS Models: Practicality Results

Table 14 shows the practicality of the model based on the observation of the implementation of SAS models support device.

Table 14. Data of practicality results of implementation of SAS models support device.

No	Rate aspects	Average aspects*
1	Measures implementation of science authentic assessment models	3.1
2	Social systems implementation of science authentic assessment models	3.9
3	Reaction principle management science authentic assessment models	3.8
IO value or value average total (VR) = 3.6		

Note: IO is intended \Leftrightarrow Operational.

*Average aspects is the average of the results of implementation of supporting device.

Science achievement test scores found that the level of student mastery (LSM) of the subject matter of science is high. Students' response to the implementation of science authentic assessment models is a slight positive, according to the teacher's response to the ease of implementing science authentic assessment models is positive.

Table 15 presents students' comment on questions related to the implementation of SAS models support device, viz.,

1. Are you able to understand the language used in the Student book, Student Worksheet, Student Manual, and SAS supplements?
2. Are you interested in the appearance (text, large font, image, layout images, colors) Student book, Student Worksheet, Student Manual, and SAS supplements?

Table 15. Data of students' comment on questions related to the implementation of SAS models.

No.	Comment	
	First question	Second question
1	Yes, because all of a language is very easy to understand	Yes, because in the student book, student worksheet, student manual, and SAS supplements, material is written clearly, accompanied by images that can allow me to learn.
2	Yes, the language of each material is clear and simple.	Yes, because the appearance makes us more interested in reading and with their images with easy to understand explanations.
3	Yes, because the language used is standard; sentences are short and clear so easy to understand.	Yes, because with the article with pictures easier for students to understand the intent rather than the text.
4	Yes, I can understand the language used in the material as it appealed to my heart	Yes, because if the appearance of text the learning atmosphere was less boring and we were happy to do our work.

Table 16 shows the results of the responses of six education experts regarding enforceability of SAS models theoretically in the field. Educational experts assessed the enforceability of SAS models in the classroom by using assessment scores: 1 very low; 2 low; 3 sufficient; 4 high; 5 very high.

Table 16. Expert response data regarding the implementation of SAS model.

No	Aspects observed and judged	Average aspects*
1	SAS models implementation procedures	4.2
2	Social aspects of SAS models implementation	4.2
3	Principal reaction management od SAS models	4.3
Average total = 4.2		

Note: *Average aspects is the average of the results of expert responses regarding the implementation of SAS model.

5. DISCUSSION AND CONCLUSION

5.1. Discussion

The analysis of the validity, effectiveness and practicality found that SAS models are supported through valid criteria applied in assessing students' competence. Student competency can be assessed in a comprehensive and sustainable manner. This finding is consistent with that of Muho and Taraj (2022) who also found formative

assessment practices helping in the sustainability of students' motivation in learning English. Student learning outcomes include cognitive aspects (products and processes), affective, and psychomotor aspects obtained from the authentic assessment. The results indicated that students meet the standards of competence specified achievement. This is because all the planning was done well. Similarly, the results obtained from the student learning achievement test at the end of the implementation of the model showed that SAS models met all the criteria. Chi, Xiu, and Zuhao (2021) conducted a study related to comparing student science and had found similar results

The results of student and teacher responses to the components and implementation of SAS models showed a positive response. It showed that in the aspect of student and teacher responses to the components and implementation of SAS models meet the criteria of effectiveness. That is, the entire device of SAS models supported the implementation of learning in the classroom and expected that students will be more motivated to learn science. Based on the results of this questionnaire, it was found that teachers followed the necessary and feasible SAS models developed on the subject of how to do more with the device making training and accompanied by the provision of laboratory equipment in accordance with the required media in the implementation of the SAS models. Similarly, the teachers stated that the strategy of implementation of SAS models can be used as a primary strategy in learning science. Vahidnia, Behzad, and Hesamoddin (2021) and Fauzan et al. (2013) also developed and validated an instrument of student attitudes towards teachers to find differences in the level of student attitudes.

The results of this study are very appropriate response to the comments of experts based on their knowledge and experience theoretically. It proved empirically SAS model implementation in the field which is derived from the observation of two (2) observers. The results indicated that the average yield assessment scores of both observers are in the high category and reliable. Thus, it can be said that the implementation of SAS models is theoretically supported by empirical data in the field with high reliability. The implementation of SAS models although observed by different people and different conditions gave inconsistent results. Toma (2021) developed a similar instrument for psychometric evaluation and got similar results. Teachers initially still face obstacles in implementing SAS models, because as a model system SAS is a form of assessment and learning system innovation. As an innovation model, the SAS model requires a shift in perspective from teachers, community, including a shift in perspective parents. Changing the way, it is not an easy task, but requires hard work and commitment. Teachers are required to be able to pay attention to individual students, monitor progress, encourage them more activity, collecting every student work to be comments, and so forth. All it requires extra time and effort. However, teachers lack strong motivation in their profession, it would be difficult to implement this SAS models. This is not in line with the results of Chi et al. (2021), Matsumoto-Royo and Ramírez-Montoya (2021) and Wong et al. (2022).

In the next phase, the teachers have been able to overcome the obstacles perceived in the early stages. Teachers, giving students the opportunity to assess themselves to the task with a friend based on the authentic assessment guidelines. Teachers keep checking on the results of such self-assessment. The impact of self-assessment is that it will foster honesty of students in doing the job. SAS Models have some weaknesses in the implementation of the class: (1) due to the limitations of the researcher, only two observers observed social skills, psychomotor skills of students, and enforceability of SAS models. This is done with the consideration that the use of many observers could affect the process of implementation of SAS models in the classroom; (2) observation of social skills, and psychomotor skills was performed in all groups. This is done with the consideration that social skills and psychomotor skills a person cannot be sampled for other people. All information to assess social skills and psychomotor skills, as well as observations were made only with one group in each meeting. There were at least seven meetings to assess the implementation of SAS models. The disadvantage of this observation is the observation frequency is too numerous but the benefit is that all students can be accessed.

The results of students in the high category and the response of students and teachers on the implementation of positive SAS models. This is in accordance with the opinion of Wiethe-Korprich and Sandra (2017) and Toma

(2021); Suwartono and Riyani (2019) which states that by applying the assessment, students' knowledge competence can be measured (Setyawarno & Kurniawati, 2018) and Sutarto and Jaedun (2018).

To conclude, this study resulted in proving SAS models as qualified products that meet the criteria of validity, effectiveness and practicality.

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REFERENCES

- Agus, K., & Suprianti, G. A. P. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Aiken, L. R. (2013). *Psychological tests and evaluation*. Mexico: Pearson.
- AlHouli, A. I., & Al-Khayatt, A. K. A. (2020). Assessing the soft skills needs of teacher education students. *International Journal of Education and Practice*, 8(3), 416-431. <https://doi.org/10.18488/journal.61.2020.83.416.431>
- Carin, A. A. (2017). *Teaching science through discovery* (8th ed.). New Jersey: Prentice Hall.
- Centoni, M., & Antonello, M. (2021). Students' evaluation of academic courses: An exploratory analysis to an Italian case study. *Studies in Educational Evaluation*, 70, 101054. <https://doi.org/10.1016/j.stueduc.2021.101054>
- Chakraborty, S., Dann, C., Mandal, A., Dann, B., & Paul, M. (2021). Effects of rubric quality on marker variation in higher education. *Studies in Educational Evaluation*, 70, 100997. <https://doi.org/10.1016/j.stueduc.2021.100997>
- Chi, S., Xiu, F. L., & Zuhao, W. (2021). Comparing student science performance between hands-on and traditional item types: A many-facet Rasch analysis. *Studies in Educational Evaluation*, 70, 100998. <https://doi.org/10.1016/j.stueduc.2021.100998>
- Fauzan, A., Plomp, T., & Gravemeijer, K. (2013). The development of an RME-based geometry course for Indonesian Primary schools. In T. Plomp, & N. Nieveen (Eds.), *Educational design research - Part B. Illustrative cases*. In (pp. 159-178). SLO: Netherlands Institute for Curriculum Development.
- Fynn, A., & Elias, O. M. (2022). Continuous online assessment at a South African open distance and e-learning institution. *Frontiers in Education Original Research*, 27(79), 1-13. <https://doi.org/10.3389/educ.2022.791271>
- Huizinga, T., Handelzalts, A., Nieveen, N., & Voogt, J. M. (2014). Teacher involvement in curriculum design: Need for support to enhance teachers' design expertise. *Journal of Curriculum Studies*, 46(1), 33-57. <https://doi.org/10.1080/00220272.2013.834077>
- Inayah, N., Komariah, E., & Nasir, A. (2019). The practice of authentic assessment in an EFL speaking classroom. *Studies in English Language and Education*, 6(1), 152-162. <https://doi.org/10.24815/siele.v6i1.13069>
- Kurniawati, A., & Sukardiyono, S. (2018). The development of authentic assessment instrument to measure science process skill and achievement based on students' performance. *Journal of Physics Education Research & Development*, 4(2), 65-74. <https://doi.org/10.21009/1.04203>
- Matsumoto-Royo, K., & Ramírez-Montoya, S. M. (2021). Core practices in practice-based teacher education: A systematic literature review of its teaching and assessment process. *Studies in Educational Evaluation*, 70, 101047. <https://doi.org/10.1016/j.stueduc.2021.101047>
- Miller-Young, J., Marin, L. F., Poth, C., Vargas-Madriz, L. F., & Xiao, J. (2021). The development and psychometric properties of an educational development impact questionnaire. *Studies in Educational Evaluation*, 70, 101058. <https://doi.org/10.1016/j.stueduc.2021.101058>
- Mohamed, R., & Lebar, O. (2017). Authentic assessment in assessing higher order thinking skills. *International Journal of Academic Research in Business and Social Sciences*, 7(2), 466-476.

- Mongkuo, M. Y., & Mongkuo, M. Y. (2017). Testing the factorial equivalence of the collegiate learning assessment performance task diagnostic instrument across lower class and upper class predominantly black college students. *International Journal of Education and Practice*, 5(6), 95-103. <https://doi.org/10.18488/Journal.61.2017.56.95.103>
- Moria, E., Refnaldi, R., & Zaim, M. (2017). *Using authentic assessment to better facilitate teaching and learning: The case for students' writing assessment*. Paper presented at the Sixth International Conference on Languages and Arts (ICLA 2017). Atlantis Press.
- Muho, A., & Taraj, G. (2022). Impact of formative assessment practices on student motivation for learning the English language. *International Journal of Education and Practice*, 10(1), 25-41. <https://doi.org/10.18488/61.v10i1.28+2>
- Salirawati, D. (2021). Authentic assessment in the pandemic period. *Journal of The Indonesian Society of Integrated Chemistry*, 13(1), 21-31.
- Setyawarno, D., & Kurniawati, A. (2018). Implementation of authentic assessment in science learning at Indonesian schools. *Journal of Science Education Research*, 2(2), 47-55.
- Sholihah, M. (2021). Authentic assessment in online learning during the covid-19 pandemic. *Edunesia: Scientific Journal of Education*, 2(2), 576-580.
- Suarimbawa, K. A., Marhaeni, A., & Suprianti, G. (2017). An analysis of authentic assessment implementation based on curriculum 2013 in SMP Country 4 Singaraja. *Journal of Education Research and Evaluation*, 1(1), 38-45. <https://doi.org/10.23887/jere.v1i1.9551>
- Susani, R. (2018). The implementation of authentic assessment in extensive reading. *International Journal of Education*, 11(1), 87-92.
- Sutarto, H. P., & Jaedun, M. P. D. (2018). Authentic assessment competence of building construction teachers in Indonesian vocational schools. *Journal of Technical Education and Training*, 10(1).
- Suwartono, T., & Riyani, C. (2019). Authentic assessment in ELT: Hopes, challenges, and practices. *Reflection on Education: Scientific Journal of Education*, 9(2).
- Svidzinskaya, G. B., Baskin, Y. G., & Mezentseva, M. E. e. (2019). Using the Semantic Differential Method to Assess the Learning Motivation and Attitude of First-Year Students towards Chemistry in University of EMERCOM of Russia. *International Journal of Education and Practice*, 7(2), 88-100.
- Syaifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*, 9(4), 1491-1502. <https://doi.org/10.12973/eu-jer.9.4.1491>
- Toma, B. R. (2021). Measuring children's perceived cost of school science: Instrument development and psychometric evaluation. *Studies in Educational Evaluation*, 70, 101009. <https://doi.org/10.1016/j.stueduc.2021.101009>
- Vahidnia, F., Behzad, G. H., & Hesamoddin, S. (2021). Development and validation of students' attitudes towards teacher's pet phenomenon scale in the higher education setting: Differences by levels of study and grade-point-average. *Studies in Educational Evaluation*, 70, 101000. <https://doi.org/10.1016/j.stueduc.2021.101000>
- Veugen, M. J., Gulikers, J. T. M., P., & Brok, D. (2021). We agree on what we see: Teacher and student perceptions of formative assessment practice. *Studies in Educational Evaluation*, 70, 101027. <https://doi.org/10.1016/j.stueduc.2021.101027>
- Wiethe-Korprich, M., & Sandra, B. (2017). Prospective educators as consumers of empirical research: An authentic assessment approach to make their competencies visible. *Empirical Research in Vocational Education and Training*, 9(8), 2-26. <https://doi.org/10.1186/s40461>
- Wong, K. K., Bajwa, T., & Fienup, D. M. (2022). The application of mastery criterion to individual operants and the effects on acquisition and maintenance of responses. *Journal of Behavioral Education*, 31(3), 461-483. <https://doi.org/10.1007/s10864-020-09420-3>

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