







Article History: Received: 03 Jan 2022; Revised: 5 July 2022; Accepted: 15 Sep 2022

Reflective Paper

Reflections on Variations in PhD Viva Regulations: “And the Options Are ...”

Edwin van Teijlingen^{1-2*} , Bibha Simkhada³ , Pramod Regmi¹ , Padam Simkhada²⁻³ , Vanora Hundley¹ , and Krishna C. Poudel⁴ 

¹ Faculty of Health & Social Sciences, Bournemouth University, UK.

² Manmohan Memorial Institute of Health Sciences, Kathmandu, Nepal.

³ School of Human and Health Sciences, University of Huddersfield, UK.

⁴ Institute for Global Health, School of Public Health & Health Sciences, University of Massachusetts Amherst, USA

Abstract

Getting a PhD is the highest possible education qualification which only a small proportion of all students achieve. As a consequence, examining PhD research in the form of a doctoral thesis is specialist work. This paper highlights the different options that are available for PhD examiners. There are four general options: (1) pass, (2) rewrite and resubmit; (3) lower degree, with or without resubmission; and (4) fail the PhD. However, from our experience, of both being examined for our own PhDs and examining others at a range of different universities, we have noted a considerable variety in detail within these common options. This paper outlines a variety of outcomes of a PhD examination, followed by four short case studies, each reflecting on a particular aspect /differences we experienced as examinees or as examiners. This paper further aims to alert PhD candidates and examiners to study the examination rules set by the awarding university, as the details of the PhD

* Corresponding Author.

 evteijlingen@bournemouth.ac.uk



ISSN: 2091-0118 (Print) / 2091-2560 (Online)

© 2022 The Author(s).

Journal homepages: ¹<http://www.kusoed.edu.np/journal/index.php/jer>

²<https://www.nepjol.info/index.php/JER/index>



Published by Kathmandu University School of Education, Lalitpur, Nepal.

This open access article is distributed under a Creative Commons Attribution (CC BY-SA 4.0) license.

examination outcome, and hence the options available to both examiners and the students may differ more than one might expect.

Keywords: PhD, examination, doctorate, external examiners

Introduction

A PhD or a Doctorate is the highest educational achievement in most academic disciplines across the globe (Park, 2005). Therefore, doing a PhD examination is one of these events which occurs only once or, very rarely, twice in someone's life. It is usually only people who stay in academia who have the pleasure of attending multiple PhD viva as a supervisor, an examiner or a chair. In the UK (United Kingdom), the PhD examination is referred to as the *viva voce*, or 'viva' for short, while in the USA (United States of America) it is usually called the 'defence'. As a student, you probably think that the PhD examination process is the same across the world, or at least the same within one country. As this paper will illustrate, this is not the case.

The requirements for the award of a PhD are that the research is based on original work that makes a significant and original contribution to the existing knowledge of the topic (Regmi et al., 2021). Surely, since a PhD qualification from the University of Aberdeen in the north of the UK is equivalent to a PhD from the University of Southampton in the south, the examination system must be equivalent too. However, our collective experience of conducting PhD viva at different universities across the UK, USA, Ireland, Nepal, the Netherlands, Finland, Australia, New Zealand (NZ), Denmark, and Belgium has taught us that there is quite a bit of variation between different universities. Before we outline the PhD examination in general, we would like to remind the reader of the existence of the Professional Doctorate in the UK. Professional Doctorate, which is more focused on practice-based knowledge, was introduced as an alternative to the traditional PhD degree (Tzavara & O'Donnell, 2021). Despite their greater focus on practice, the process of examining such a Professional Doctorate is often the same as for PhD and follows similar criteria (Tzavara & O'Donnell, 2021)

PhD Examiners

In the UK, there is always at least one internal and one external examiner. In addition, some universities have an independent chair at the PhD viva. If a member of

staff defends PhD viva in his/her own institution, there are usually two external examiners. In the UK, a viva is an unseen exam whereby the candidate, typically two examiners (one internal & one external) and perhaps one supervisor and a viva chair, sit in an office or classroom. An examiner external to the university is there to uphold the standards of the academic discipline, while the internal examiner is expected to uphold the standards of the institution (Rüger, 2016). The external examiner could be from an overseas institution. The external examiner should be close enough to the academic field that they will have a real appreciation of what students are doing, but they don't have to be doing exactly the same thing. The internal examiner must be from outside the supervisory team but from the same institution. In the UK system, the external examiner wields considerable power. Hence it can be risky to pick someone who is completely outside the student's or supervisors' professional network.

The Nature of PhD Viva

The examination for the viva typically takes two to three hours, although it can last anywhere between 20 minutes and four or five hours or more (Flack, 2017). It is our experience that lengthier vivas may occur where there is a disagreement between examiners or where the examiners are less experienced and focus on smaller details rather than the bigger picture (Kiley & Mullins, 2004). Given that the viva is conducted behind closed doors, determining the average length of a viva is difficult. However, there are examples reported in the literature, such as Paul Spencer's PhD viva in Microbiology, which took four hours (Thomson, 2014).

Since the start of the COVID-19 pandemic, the examination process has often moved to an online examination (=virtual viva), with very much the same procedures and rules. The viva is the place where the decision about the PhD is made on the basis of the written thesis and the oral defence.

The UK PhD viva regulations are typically the same across disciplines and departments. However, the viva process is open to a degree of uncertainty, introduced by the fact that the assessment process is largely subjective (Carter & Whittaker, 2009). With any oral examination involving external examiners or a supervisory committee, there is the potential for inconsistency and perhaps subjective decision-making (Lovat et al., 2015). Some have argued that the choice of examiners is important in ensuring a fair and unbiased examination (Kiley, 2009). The potential for inconsistency has led

some to ask whether it might be more valuable to just examine the evidence of the written word (Carter & Whittaker, 2009). Regmi et al. (2021) reminded us that most UK PhD students are asked to rewrite selected parts of the thesis, but some are also be asked to do more research, further analysis, more reading, and incorporate specific theories or relevant literature. Such changes or additions post viva are usually signed off by one or more of the examiners, although occasionally, the candidate may be required to have a second viva.

In contrast, most universities in Australia do not include an oral viva as standard, but there is the opportunity for external examiners to request an ‘oral component’ should they feel that it is required (Kiley et al., 2018). In many countries in Continental Europe, for example, Nordic countries, Belgium, and the Netherlands, the examination process, or the defence, is far more focused on the examiners’ pre-reading of the draft thesis, offering comments and issues for correction prior to the viva. Again the university regulations in these countries are usually the same for all academic disciplines. The actual viva is a public celebratory event with friends and family in attendance; it is an event for dressing up in traditional robes, much like the traditional graduation at a UK university.

In the USA, PhD students must complete specific coursework as well as a qualifying examination before working on a PhD dissertation. Once the research dissertation is completed and reviewed by the Dissertation Committee members, a viva is organised, which is called the defense. In the USA, the regulations for a PhD are more discipline-specific than in the countries outlined above. Hence, we remind the reader that the ones listed below are specifically for Public Health. In the American defense, every member of the Dissertation Committee must be present in person or online if needed for the examination. It is often the case that any graduate faculty and students from within the university may attend the dissertation defense. Other guests can also attend the defense at the examinee's request and with the Committee Chair's permission.

The Viva Outcome Options

UK universities share the viva outcome with the candidate (and supervisors) immediately after the viva. Generally, the candidate is asked to wait outside the examination room to allow for a final discussion between the examiners, and once they reach an agreement, the candidate is informed. Our experience is that these discussions

can be quite lengthy where there is a disagreement between examiners. This may include considerations regarding what it is reasonable to expect the student to do in order to obtain the degree.

Table 1

The Rewrite and Resubmit Options of PhD Theses in the UK

| Options | Full-time period* | Requirement |
|---------------------------|--------------------------|----------------------------------|
| Typographical corrections | 2 weeks | Internal examiner |
| Typographical corrections | 1 month | Internal examiner / any examiner |
| No changes to thesis | Ten weeks | New oral only |
| Minor corrections | 3 months | Any examiner |
| Minor corrections | 4 months | Additional oral both examiners |
| Minor corrections | 4 months | No oral needed |
| Major corrections | 6 months | With or without new oral |
| Major corrections | 12 months | Additional oral |
| Major corrections | 18 months | With or without new oral |
| Awarded lower degree** | N/A | Both examiners |
| Resubmission lower degree | 6-12 months | With or without new oral |

* Maximum period for full-time students, this is usually doubled for part-time students.

** Lower degree is typically MPhil, occasionally MSc by Research or MRes

Table 1 illustrates the range of potential outcomes of a UK-style viva. Here we focus on universities’ regulations from a sample of five universities, mainly based in the UK, also in Nepal and the USA. We found four options: (1) pass, (2) rewrite and resubmit; (3) lower degree, with or without resubmission; and (4) fail. The first and last are very similar across all universities. The key difference we found is all around the requirement to ‘rewrite and resubmit’.

Being aware of the various permutations that can arise at different universities may encourage university standards committees to set more uniform outcomes. In the short run, greater awareness among supervisors can ensure that they support their PhD students who may be submitted to a different set of options than the supervisors experienced in their own PhD viva. Finally, it serves as a reminder to students, supervisors, and examiners to ensure they have read and considered the specific regulations of the PhD awarding institution (often called the code of practice).

To illustrate the difference at UK universities, we have listed full options for three universities, the one we found with the most options, the University of Edinburgh, and the two universities where most of the authors work, Bournemouth University and the University of Huddersfield. This is followed by the PhD examination at Tribhuvan University (TU) in Nepal. For comparison and completeness, we have also included the full set of options for a PhD examination at one institution in the USA.

The Options After the Viva as Set Out in a Selection of Universities' Regulations

The longest list of options (n=10) came from the University of Edinburgh (2019) in the Scottish capital; see details Table 2. Here there are more options than at most UK universities. The University of Edinburgh details the various resubmission options and splits the two lower degrees (MPhil and MRes) that can be awarded when the examiners conclude that the work is not good enough to be awarded a PhD.

Table 2

Options after PhD viva provided by the University of Edinburgh

-
1. Award PhD/Doctorate.
 2. Minor Corrections ... to the thesis must be completed within three months and are subject to certification by the Internal Examiner(s), and by the External Examiner (where examiner so requests), before the degree is awarded;
 3. Additional Oral Examination Needed. ... student is required to undergo further assessment, written, oral or practical, and make any corrections to the thesis within a specified period of not more than four months.
 4. Additional Work on Thesis Needed - No Oral Re-Examination - Resubmission for PhD/Doctorate.
 5. Substantial Work (not exceeding 12 months) on Thesis and Oral Re-Examination Needed – Resubmission for PhD/Doctorate.
 6. Award MPhil.
 7. Award MPhil following Minor Corrections.
 8. Substantial work on Thesis Needed, resubmission and MPhil oral examination.
 9. Award MSc by Research.
 10. Fail
-

Bournemouth University, in south of England, includes six options. The time given to make changes and resubmit is listed separately for full-/part-time students in Table 3.

Table 3

Options after PhD viva provided by Bournemouth University (2022-2023)

| PhD awarded | |
|--|--|
| The appropriate award be made subject to CORRECTIONS being made to the thesis | |
| Timescale (normally): 1 month full time (FT)/2 months part time (PT) Corrections NOT requiring academic re- assessment. | If examiners are satisfied candidate has in general reached standard required for degree, but consider thesis requires some minor corrections not requiring academic re-assessment (e.g. typographical errors or re-organisation of material) they may recommend degree be awarded subject to candidate correcting the thesis to satisfaction of relevant examiner. Examiners must indicate in writing what minor corrections are required and timescale for submission.... |
| The appropriate award be made subject to AMENDMENTS being made to the thesis | |
| Timescale (normally): max 6 month FT/ 12 PT Amendments = substantive changes incl. clarification of points, additional references plus typographical, grammatical, reformatting, restructuring. | If the examiners are satisfied the student has in general reached the standard required for the degree, but consider the thesis requires substantive amendments, but not so much as to call for the re-submission of the thesis, they may recommend the degree be awarded subject to candidate amending the thesis to the satisfaction of the internal and/or external examiner(s). In such circumstances, the examiners must indicate in writing what amendments and corrections are required. The timescale is to be agreed with candidate following the examination and communicated to the candidate in writing. |
| Student be permitted to RESUBMIT for the degree and be re-examined; | |
| Timescale (normally): Max 12 months FT /months PT Re-submission would normally require review of methodological approaches, re-examine data and/or analyses etc. | If examiners recommend re-submission of thesis, student may be required to review methodological approaches, re-examine data/analyses, etc...examiners must indicate in writing what amendments are required. Timescale is to be agreed with student...Examiners must also indicate whether student will be required a further <i>viva voce</i> following examination of resubmitted thesis...(which) should be carried out by both examiners. Where thesis has previously been examined, a second re-submission is not permitted – i.e. student may only resubmit once. |
| Awarded the lower research degree of MRes/MPhil | |
| NOT be awarded the degree and not be permitted to be re-examined | |

The University of Huddersfield, in north of England, includes eight options as illustrated in Table 4.

Table 4

Options After PhD Viva Provided by University of Huddersfield (2021-2022)

Following examination, including the viva, the examiners may recommend:

- **Award** (without amendments).
 - **Award subject to the completion of editorial and minor presentational corrections.** The revised submission must be presented to the satisfaction of the internal examiner only, normally within two weeks from the date of the notification of the outcome of the examination...
 - **Award subject to minor amendments.** The resubmission addressing all amendments must be completed to the satisfaction of the internal examiner only, within three months from the date of the notification of the outcome of the examination... If internal examiner is not satisfied that all corrections have been made the examiner reserves the right to award an MPhil.
 - **Referral to complete major amendments.** The resubmission addressing all amendments must be completed to the satisfaction of all examiners within six months from the date of the notification of the outcome of the examination. On receipt of the resubmitted work, the examiners reserve the right to require a further viva examination.
 - **Referral to re-write the submission.** The resubmission must be completed to the satisfaction of all examiners within one year from the date of the notification of the outcome of the examination. On receipt of the resubmitted work, the examiners reserve the right to require a further viva examination.
 - **Referral to complete major amendments and resubmit for award of MPhil.** The resubmission addressing all amendments must be completed to the satisfaction of all examiners within six months ...On receipt of the resubmitted work, the examiners reserve the right to require a further viva examination.
 - **Award the degree of MPhil subject to the completion of editorial and minor presentational corrections.** The revised submission must be presented to the satisfaction of the internal examiner only, normally within two weeks from the date of the notification of the outcome of the examination. No award will be conferred unless the internal examiner is satisfied that all corrections have been made.
 - **Fail so that the candidate is not awarded a degree.**
-

The viva in Nepal is organised more like the European continental countries, with examiners pre-reading the draft thesis; interestingly, the Faculty of Education at Tribhuvan University uses the word dissertation, not a thesis. The PhD examination at TU has the three outcomes mentioned above (pass/resubmit/fail). However, the process of examining the PhD appears to be more complicated than at a UK university, as shown in Table 5.

Table 5

Examination process of PhD thesis at Tribhuvan University, Nepal

A thesis is sent to three examiners, at least one from overseas and two from SAARC countries.* If there is a difference of opinion among the examiners with regard to the acceptance of the thesis, the following arrangements exist:

- The thesis will be rejected if two out of three examiners reject it.
- If one examiner rejects the thesis, it will be referred to a new examiner, for the final decision, however, if the new examiner rejects it again, the thesis will be rejected.
- If any of the examiners suggest that the thesis be revised, the candidate will be asked to make the necessary improvements and revisions according to the suggestions made by the examiner(s).
- The thesis must be resubmitted if so recommended by the examiner(s) only once, and it shall be examined by the examiner assigned by Research Committee.
- A revised thesis must be resubmitted by the candidate within six months.

If the thesis is accepted, the candidate shall have to take an open oral examination (viva-voce), which will be conducted by the external examiner ...

* South Asian Association for Regional Cooperation (SAARC) is an economic and political organization of eight countries in South Asia, including Nepal and India.

The final set of outcomes is from the USA, from the Community Health Education Program at the University of Massachusetts' Amherst School of Public Health and Health Sciences. This American university also uses the term dissertation instead of thesis (see Table 6).

Table 6

Examination Process of PhD Example University of Massachusetts (USA)

After the defense, the Dissertation Committee meets to deliberate the results. In this session, each committee member votes on whether the dissertation and its defense are satisfactory or not.

This vote must be unanimous for the student to pass the dissertation defense.

In the case of failure, the defense may be rescheduled one to six months later.

If the second attempt results in failure, the student is automatically dismissed from the doctoral programme.

Case Studies Based on Authors' Reflections

The following four case studies each highlight a particular aspect of the PhD viva, which was affected by the different options and or interpretations of the rules of the particular university by the examiners. The case studies are presented anonymously to illustrate the systematic difference that exists, not to name and shame specific universities.

Case Study 1

Several of us have conducted a PhD examination in Australia after having conducted several viva in the UK. The first time each of us expected that our written report on the thesis would be part of an oral viva in which we would participate or at least have some input. Two of us at two different Australian universities received no feedback as external examiner. Usually, the Australian university informs the external examiner months later that the candidate has been awarded the PhD.

Case Study 2

One of us recently acted as an overseas external examiner for an NZ university. After submitting detailed written feedback on the thesis, the postgraduate research degree committee decided on the basis of the reports from internal and external whether the oral examination is needed based on the examiners' report. The committee offered

the overseas external examiner the option to be present at an oral examination. Here the outcome of the oral examination was shared with the external examiner abroad.

Case Study 3

At UK universities, the internal examiner and/or the chair of the viva often try to get the best outcome for their student, which is minor rather than major corrections. This can result in a quite difficult negotiation/ discussion between the internal and external examiner since university guidelines typically cannot specify exactly what constitutes ‘minor’ corrections rather than ‘major’ corrections. One of us examined a PhD which was signed off with minor corrections and the student was given one month to resubmit. Two months later the same external examiner signed off a PhD as needing major corrections at a different university for more or less the same amount of corrections. This was largely due to the two universities having quite different texts in their regulations as to what constituted minor as opposed to major corrections.

Case Study 4

Some universities require that the student must be reexamined by viva if major corrections are required, whereas others will leave the decision regarding a further viva to the examiners, and some do not have the option of a second viva on resubmission of the thesis. One of us conducted a viva of resubmission at a UK university, not having been part of the original examining team the year before. The candidate had been asked to do a considerable amount of extra research. In their resubmitted thesis, they added quite a lot of new mistakes in the form of typos, missing references and straightforward mistakes in the reference list, and inconsistencies between the text left-over from the original thesis and the resubmitted one.

Since this particular university included a second viva as part of the resubmission this did not seem a problem at first. It became a problem when the candidate resubmitted the thesis for the second time (i.e. the third submission), and the external examiner still found many mistakes in style, grammar, and, especially the precision of the reference list, as the university’s regulations at this final stage only offer the option of fail or accept as is. In the end, the examiners asked the candidate informally to make these final corrections before awarding the degree.

Final Thoughts: Differences and Similarities

The number of outcome options open to the examiners vary, with most variations appearing in the category of resubmission. The options represent five overall categories: (1) award PhD as presented; (2) minor corrections; (3) major corrections [with or without re-examination]; (4) award lower degree [with or without resubmission]; and (5) outright fail. Whilst the first and the last options are always the same, the details of the option between can vary most. Looking at the details of these intermediate outcome options, the key differences are in relation to the length of time given to resubmit after the initial viva, who assesses the resubmitted thesis, and whether a second viva is required. Understanding these differences is important to both the student and their supervisors who may be supporting a resubmission.

We have tried to offer the reader some insights into the PhD examination. This paper summarises PhD examination outcomes from universities in different countries, some we have summarised but several we have provided in full of alerting both future PhD students and examiners of the lack of uniformity in regulations. This paper is also a reminder to external examiners to read the postgraduate regulations of the inviting university, as most do not seem to do so (Carter, 2008). When you are invited to act as an external examiner, it is important to read the details of that university's regulations as they can be different from your university, where you may have acted as an internal examiner or external examiner, and from your own PhD viva as a student. This can lead to examiners having wrong/unrealistic expectations due to differences in university procedures regarding the viva outcome (Tinkler & Jackson, 2000).

This paper also reminds current PhD candidates to search for and read their university's PhD regulations. The PhD examination process varies significantly across countries and universities. Moreover, it is known that PhD candidates can have odd preconceptions or unfortunate expectations of what a viva constitutes (Wellington 2010). These facts combined mean that prospective viva candidates seeking advice from fellow PhD students on online fora may end up with wrong expectations about the possible outcomes of a viva at their own university. As a PhD supervisor, preparing your students for the viva is wise, including pointing out beforehand the possible outcomes they can expect.

Disclosure

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

ORCID

Edwin van Teijlingen  <https://orcid.org/0000-0001-5523-8583>

Bibha Simkhada  <https://orcid.org/0000-0002-8676-0718>

Pramod Regmi  <https://orcid.org/0000-0003-0226-3894>

Padam Simkhada  <https://orcid.org/0000-0002-5706-6479>

Vanora Hundley  <https://orcid.org/0000-0003-3578-4135>

Krishna C. Poudel  <https://orcid.org/0000-0002-6013-7928>

References

- Bournemouth University. (2022). *8A code of practice for research degrees (Policy, procedure and guidelines): Academic year 2022-23*.
<https://intranetsp.bournemouth.ac.uk/pandptest/8a-code-of-practice-for-research-degrees.pdf>
- Carter, S. (2008). Examining the doctoral thesis: A discussion. *Innovations in Education and Teaching International*, 45(4), 365-374.
<https://doi.org/10.1080/14703290802377208>
- Carter, B., & Whittaker, K. (2009). Examining the British PhD viva: Opening new doors or scarring for life? *Contemporary Nurse*, 32(1-2), 169-178.
<https://doi.org/10.5172/conu.32.1-2.169>
- Flack, D. (2017). Surviving the Viva. *The Social Network*.
<https://socialnetwork.blog/2017/08/25/surviving-the-viva/>
- Kiley, M., Holbrook, A., Starfield, S., & Paltridge, B. (2018). *An oral component in PhD examination in Australia: Issues and considerations (AUR 60 01)*.
<https://www.nteu.org.au/unda/article/An-oral-component-in-PhD-examination-in-Australia%3A-Issues-and-considerations-%28AUR-60-01%29-20307>
- Kiley, M., & Mullins, G. (2004). Examining the examiners: How inexperienced examiners approach the assessment of research theses. *International Journal of Educational Research*, 41(2), 121-135.
- Kiley, M. (2009). 'You don't want a smart Alec': Selecting examiners to assess doctoral dissertations. *Studies in Higher Education*, 34(8), 889-903.

- Lovat, T., Holbrook, A., Bourke, S., Fairbairn, H., Kiley, M., Paltridge, B., & Starfield, S. (2015). Examining doctoral examination and the question of the viva. *Higher Education Review*, 47(3), 5-23.
- Park, C. (2005). New variant PhD: The changing nature of the doctorate in the UK. *Journal of Higher Education Policy & Management*, 27(2), 189-207. <https://doi.org/10.1080/13600800500120068>
- Regmi, P., Poobalan, A., Simkhada, P., & van Teijlingen, E. (2021). PhD supervision in public health. *Health Prospect: Journal of Public Health*, 20(1), 1-4. <https://doi.org/10.3126/hprospect.v20i1.32735>
- Rüger, S. (2016). *How to write a good PhD thesis and survive the viva* <http://people.kmi.open.ac.uk/stefan/thesis-writing.pdf>
- Thomson, P. (2014). *How long will my viva be?* <https://patthomson.net/2014/01/06/how-long-will-my-viva-be/>
- Tinkler, P., & Jackson, C. (2000). Examining the doctorate: Institutional policy and the PhD examination process in Britain. *Studies in Higher Education*, 25(2), 167-180, <https://doi.org/10.1080/713696136>
- Tzavara, D., & O'Donnell, V. L. (2021). External examining the professional doctorate as distinct from the traditional PhD: Differentiating and developing policy and practice. In E. Sengupta, P. Blessinger, A. Ssemwanga, & Cozza, B. (Eds.), *The role of external examining in higher education: Challenges and best practices* (Vol. 38, pp. 95-121). Emerald.
- University of Edinburgh. (2019). *Postgraduate assessment regulations for research degrees: Academic year 2019/20*. <https://www.ed.ac.uk/files/atoms/files/2019-postgraduateresearch.pdf>
- Wellington, J. (2010). Supporting students' preparation for the viva: Their pre-conceptions and implications for practice. *Teaching in Higher Education*, 15(1), 71-84.

To cite this article:

van Teijlingen, E., Simkhada, B., Regmi, P., Simkhada, P., Hundley, V., & Poudel, K. C. (2022). Reflections on variations in PhD viva regulations: “And the options are...”. *Journal of Education and Research*, 12(2), 61-74. <https://doi.org/10.51474/jer.v12i2.624>