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Landscape assessment - a forgotten tool for stimulating student inquiry?

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29 **Abstract**

30   Approaches to landscape assessment have been widely debated and, despite their usefulness

31 in educational settings, they have generally fallen out of favour. Yet ways to record, monitor and

32 discuss landscape quality are becoming more important as the pace of landscape change increases.

33 The growing prominence of 'place' and 'place-making' in geography presents an opportunity to

34 reinvigorate landscape assessment in educational contexts. We present a tool for assessing the visual

35 quality of landscapes, which can be adapted for use in a range of environments. We also discuss the

36 results of a pilot study which deployed the approach. The tool can be used to monitor landscape

37 changes and the experience of generating data, as well as the results, can be used as a catalyst for

38 discussions about place, land-use, development and the contested nature of valued landscapes.

39

40 **Keywords:** landscape change, aesthetics, place, inquiry-based learning, fieldwork

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1. Introduction and aims

We live in a world of changing landscapes. Landscape assessment is often used to assess the impact of changes, as it gives us a baseline from which change can be monitored. Such evaluations frequently form part of Environmental Impact Assessment, where they help to explore the consequences of a new development or land-use change. Landscape assessment has had a mixed history; it has played an important role in environmental management and policy development, but tensions have often emerged regarding the best approaches to take (e.g. Tveit et al., 2006; Ode et al., 2010), objective versus subjective methodologies and the difficulties of assigning a score to a view (e.g. Lothian, 1999; Daniel, 2001). Controversy has vexed landscape assessment and many of the techniques developed three or four decades ago have fallen out of favour.

However, means to record and monitor landscape quality are becoming increasingly important as the pace of landscape change escalates. Landscapes are experiencing exceptional rates of transformation due to a variety of influences, including the rapid rate of societal development and increasing urbanisation. The impacts of climate change greatly influence our physical environment, from land-forming processes to species and habitat composition, and there are resultant landscape pressures. In addition, the spiritual and recreational experiences that people get from environments are recognised as a form of cultural ecosystem service (e.g. Daniel et al., 2012), but experiences are more difficult to assess than other ecosystem services, such as food production or crop pollination (Satz et al., 2013). Set against the backdrop of landscapes that are changing in response to an array of processes and a growing appreciation of what our environment does for us (Tratalos et al., 2016), we propose that landscape assessment, particularly the visual quality assessment of landscapes, has a new lease of life (see Swetnam et al., 2017; Swetnam and Tweed, 2018; Jovanovska et al., 2020).

Geography is well-placed to champion landscape quality assessment; most of the drivers of landscape change have a geographical dimension and, whether implicit or explicit, the study of landscapes is central to the discipline. The agents of global transformation are increasingly being introduced, investigated and debated in educational settings. Related questions and problems often bring together the two 'sides' of the discipline - and beyond - in seeking to understand landscape change, and the ability to read and decode landscapes is a vital skill. Landscape also features in notions of place and place-making, which are now a fundamental part of geography curricula.

72 However, there is little research available to guide the effective teaching of landscape assessment

73 skills or to assess student experiences of engaging in such activities. This paper, and the resources

74 connected to it, start to address this gap. We argue that the stage is set for the reinvigoration of

75 landscape assessment in geography education.

76   We have developed a simple means of visual landscape quality assessment which can be

77 adapted to suit different environments. It can be used to monitor visual changes in rural and semi-

78 rural landscapes, in the field or in virtual situations and the data that are generated - and the

79 experience of collecting them - can be used as a starting point for discussion and debate about

80 landscape quality, land-use, aesthetics, place and development. This paper i) provides a brief context

81 to landscape assessment; ii) presents a Visual Quality Index (VQI) for the evaluation of landscapes;

82 iii) provides associated supporting materials for teachers to use and iv) discusses the experience of

83 using the VQI in educational settings. It should be noted that we see a significant part of the utility of

84 the approach as a catalyst for discussions about place, aesthetics and the contested nature of 'valued'

85 landscapes, rather than the ability to arrive at a score; this will be discussed later.

86

87 **2. Landscape quality and geography education**

88   Understanding of physical and social processes within the context of places is central to

89 geography and the landscape view can provide a starting point for investigation. To monitor

90 landscapes, there is a need to examine their 'quality'. Essentially "landscape quality arises from the

91 relationship between the properties of the landscape and the effects of those properties on human

92 viewers." (Daniel, 2001 p.268). Put simply, landscape quality identifies what people like to see in

93 landscapes and what they find appealing. From this, two paradigms have arisen (Lothian, 1999).

94 *Landscape assessment* focuses on describing the landscape, whereas *landscape evaluation* seeks to

95 identify what makes one landscape better or worse (Ode et al., 2008) and often places a rating on,

96 or orders, landscapes in terms of their quality. Expert-based approaches have dominated in

97 landscape management, providing quantifiable scores to be examined and monitored (Daniel, 2001).

98 Such systematic methods to visually assess landscape quality have developed over the last fifty years;

99 during the 1970s and 1980s attempts were made to quantify the process of landscape assessment

100 using statistical analyses (Dearden, 1980; Lothian, 2017), but these endeavours were accompanied

101 by disagreements about their usefulness and the extent to which over-concentration on numeric

102 methods rendered the process reductionist (e.g. Roth and Gruehn, 2012; Lothian, 2017).

103   There has also been vigorous debate about whether landscape evaluation should be

104 undertaken by experts, such as planners, or whether the task should be the province of the lay public

105 (e.g. Kaplan and Kaplan, 1989). Over the last twenty years or so, there has been increasing tendency

106 to advocate subjective approaches that are based on a community's landscape preferences (e.g.

107 Dakin, 2003; Ode et al., 2008) and a growing appreciation of the importance of the individual's

108 personal reaction to landscapes (Daniel, 2001). In part, this merging of 'expert' and perception-based

109 approaches stems from the realisation that aspects of visual aesthetics need to be better represented

110 in management decisions and policies (Daniel, 2001; Dakin, 2003; Terkenli et al., 2021). Despite this,

111 the tension between qualitative and quantitative components in landscape evaluation remains (e.g.

112 Lothian, 1999; Daniel, 2001; Terkenli et al., 2021). Debate often centres on the question of what

113 exactly is being evaluated; for example, is it the scene itself or feelings and potential activities

114 associated with it, such as nostalgia, refuge or leisure? Is it even possible to separate these in the

115 mind of the assessor? Enjoyment based on aesthetics is inherently subjective and can be influenced

116 by socio-cultural bias (e.g. education, familiarity) and ephemera (e.g. weather, odours, seasonal

117 changes). Put simply, many researchers agree that assessment of landscape quality is important and

118 have devised ways of evaluating landscapes, but there no universal agreement on how to do it.

119   The fact that the assessment of the visual quality of landscapes remains contested means that

120 it can be challenging for people to understand and correspondingly challenging to teach, but 'reading'

121 landscapes is a fundamental skill in seeking to identify and explain environmental changes,

122 particularly in the field. The landscape view is also prominent in ideas of place and place-making in

123 'A' Level geography; in order to understand places as locations with meaning, we also need to

124 understand our relationships with landscape. Given the importance of landscapes and the well-

125 articulated benefits of fieldwork learning, there is clearly scope for activities that encourage young

126 people to engage more holistically with the environments in which they are collecting field data. This

127 is particularly timely given the increasingly 'indoor' nature of childhood and concerns about nature-

128 deficit disorder (e.g. Louv, 2008; Fletcher, 2017; Zylstra et al., 2019). Warn (1985) in her step-by-step

129 guide for students undertaking fieldwork, presents a simple landscape evaluation sheet which

130 addresses open space, variety of features, flora and fauna, intrinsic appeal (boring, interesting, ugly,

131 beautiful etc.) and the impact of people on the landscape. Thirty-five years on, we see the VQI as

132 developing this sort of approach to provide teachers and students with a framework for assessing

133 and debating landscape quality.

134

135 **3. Introducing the Visual Quality Index (VQI) as an educational tool**

136 The VQI was originally developed as part of a monitoring programme, funded by the Welsh

137 government. The programme was designed to evaluate the landscape impact of the Glastir Agri-

138 environmental scheme (see Swetnam et al., 2017) and was devised as a GIS-enabled method due to

139 the nature of the monitoring to be undertaken. The Welsh VQI was successfully transferred to

140 Iceland, having first been adapted to reflect the differences in the landscape setting (see Swetnam

141 and Tweed, 2018) and it has also been successfully modified for use in other locations (e.g.

142 Jovanovska et al., 2020). Below we explain the key parameters of the VQI that we present in this

143 paper as an educational tool, which is a slightly modified version of the original used in Wales. It

144 should be noted that the VQI is designed as a tool for use in rural and semi-rural landscapes.

145 There are five thematic elements to the VQI: physical, blue space, green space, historic and

146 human, generating a final value that ranges from 0 (worst/low) to 1 (best/high). The physical element

147 identifies the roughness of the terrain, which captures the topographic complexity of the view. The

148 terrain element contributes positively to the index, as rugged and undulating scenery tends to be

149 highly rated by people. Most people also appreciate the presence of water in landscape views, so the

150 coast, ponds, lakes, streams and waterfalls are positive influences on the VQI. The presence and

151 nature of vegetation is important in landscape evaluation so woodland, hedgerows, large trees and

152 species diversity are key elements of the VQI's green space theme. Cultural and historic features (for

153 example, listed buildings, dry stone walls, ancient monuments) are positive elements of landscape

154 visual quality. Other human influences that reduce visual landscape quality are captured by the final

155 theme which comprises roads, buildings and associated human utilities and infrastructure. Figure 1

156 illustrates the VQI landscape components. The totals for each theme are collated and then scaled

157 between 0 and 1, with the five thematic groups weighted equally (0.2) and summed to produce the

158 final index. Equal weighting assumes that each of the landscape components contribute equally to

159 the visual quality of the landscape (Swetnam et al., 2017). The index enables the visual quality of a

160 series of landscapes to be assessed and ordered according to the numeric value that the index

161 generates indeed, it is the order in which the VQI places sites that is important, rather than the overall

162 score (see Swetnam and Tweed, 2018).

163 In addition, given that there has been significant research on the aesthetic appeal of

164 landscapes (e.g. Gobster et al., 2007; Jóhannesdóttir, 2010; Frank et al., 2013) we incorporate a set

165 of simple descriptive 'appeal' criteria that enable individuals to record - and subsequently compare -

166 personal landscape appeal qualities. Is the landscape beautiful or ugly? Exciting or dull? Varied or

167 uniform? It has been established that landscape preferences can be mediated by ephemera (e.g.

168 smells, weather conditions); therefore, participants are also encouraged to record these elements as

169 part of the approach. The appeal and ephemera ratings sit outside the VQI but can be compared

170 against the VQI scores to see if landscapes generating high visual quality scores are viewed as

171 'beautiful', 'exciting' or 'varied', for example. The landscape questionnaire survey used by

172 participants to collect data is illustrated in Figure 2; this is supported by an Excel spreadsheet that

173 enables the calculation of the final index for each landscape that is assessed (see Supplemental
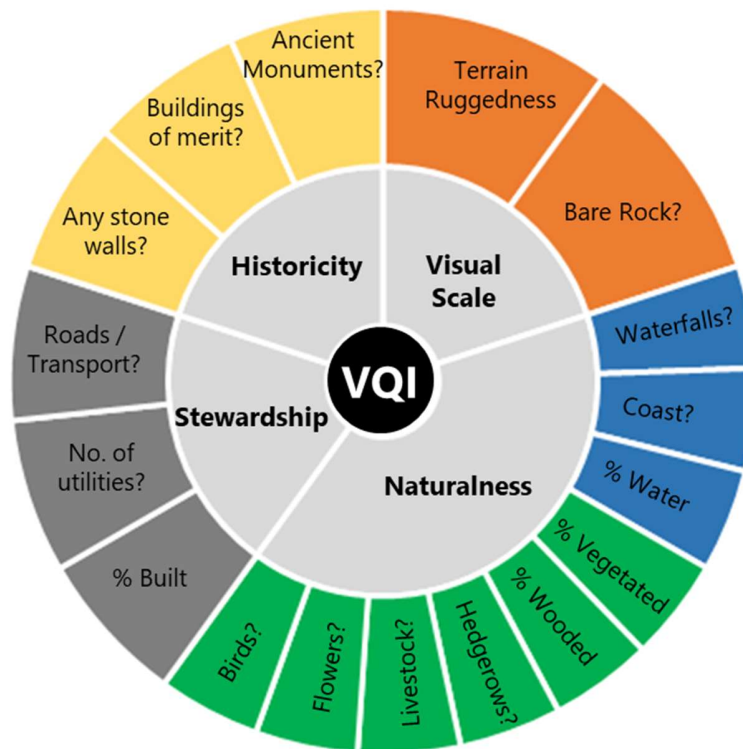
174 Online Materials).

175

Figure 1: The VQI mapped onto four key landscape components outlined by Ode et al., 2008 including: (i) indicators of visual scale; (ii) indicators of naturalness; (iii) indicators of historic value; (iv) indicators of stewardship. The 17 parameters are grouped into five themes which have an equal weight of 0.2 in the final VQI, therefore, the value of each theme is scaled before weighting to account for the unequal number of components in each.

Figure 2: The VQI landscape survey (see also Supplemental Online Materials)

4. Piloting the VQI in an independent educational setting

The Field Studies Council (FSC) is an independent UK-based environmental education charity specialising in outdoor learning to support curricula from primary school to university. Participants engage in fieldwork on day visits and residential stays; fieldwork can be biological, ecological, environmental or geographical in nature. Existing collaborative links with the FSC presented an opportunity to trial the VQI as a learning tool by embedding it within their diet of fieldwork activities. During consultancy with the FSC, it was agreed that the technique needed to be short, complementary to existing days and fit in with the national curriculum. It was decided that the VQI could be used as an introduction to sites in which field measurements were being taken and there was also the scope for it to act as a thread, tying together various fieldwork landscapes. The VQI was

199   piloted by the FSC at their Epping Field Centre, from 2018-2019 (see Jones, 2022). To enable

200   compatibility with existing tools and methods used by the FSC, the landscape questionnaire was

201   adapted to operate in ESRI Survey 123^{TM} using tablets for participants to record the data in the field.

202   During 2018 and 2019, the VQI was used with approximately 250 students. Most of the participants

203   were 'A' Level Biology students studying Ecology. The VQI was used to encourage site familiarity

204   before engaging in a range of routine data collection techniques. Given the limitations of time and

205   access to IT, not every student was able to respond individually to the landscape questionnaire;

206   instead groups discussed each element and agreed a score.

207

4.1. FSC Tutors' feedback

209   Field Tutors used the VQI within course delivery at Epping Forest Field Centre (EFFC) in 2018

210   2019; students visiting FSC accessed local sites within Epping Forest, typically open view grassland

211   plains and more enclosed woodland views (see Jones, 2022). As part of the trial, Field Tutors were

212   asked for feedback on their experience of using the VQI and for their views on how students engaged

213   with the approach; this feedback is summarised in Figure 3. Tutors felt either confident or very

214   confident in using the VQI as a teaching resource and in using Survey 123^{TM} to collect data (Figure 3).

215   Tutors found groups to have different levels of engagement with the approach, but most students

216   were engaged or strongly engaged (Figure 3). Given the limitations of timings and access to IT,

217   students did not provide individual responses and there are opportunities and challenges inherent in

218   this approach. Most participants were engaged in discussing how to arrive at a score, and it may be

219   helpful in a learning context to discuss what goes into the landscape view, but the landscape appeal

220   and ephemera sections are quite personal. Tutors commented that individual engagement could be

221   improved by providing more tablets to permit individual data entry. Another potential solution would

222   be to make the method mobile-friendly to enable individual access.

223   Field Tutors were keen to have an information sheet that could be used by staff or given to

224   teachers to help explain the background and rationale for the technique. Tutors also suggested that

225   it would be helpful to have a visual guide to support students in completing the VQI; this would assist

226   students in the interpretation of some terms that they could not imagine in the context of the view.

227   The use of illustrative supporting materials may also make the VQI accessible to a wider range of age

228 groups through suitable differentiation. Tutors also noted that this approach has potential to be used

229 within the FSC, not just during 'A'-Level field-based activities, but as a resource from foundation stage

230 to undergraduate and beyond. One member of the FSC education team reported the following when

231 asked about the VQI:

232

233 *"I have found using the VQI with students a very valuable tool to encourage*

234 *students to look at the 'bigger picture' of landscapes. It has encouraged students to*

235 *think about what makes up landscape. It is also a very useful tool in introducing*

236 *students to an area and supporting their fieldwork in enabling to develop inquiry*

237 *questions for further fieldwork."*

238 FSC Senior Tutor

239

240 The VQI was also used in an FSC educational training session with a group of approximately 20

241 PGCE students from a nearby university and the following points were made:

242

243 *"We had a discussion about how you quantify the value of landscapes, the students*

244 *found they were thinking about different aspects of landscapes, other than just 'it's*

245 *pretty to look at'…"*

246 FSC Senior Tutor

247

	Very Disengaged	Disengaged	Neutral	Engaged	Very Engaged
How engaged do you feel students are with the VQI?	0	0	2	3	2
	Foundation	**KS1**	**KS2**	**KS3**	**KS4**	**KS5**
Which Key Stage do you feel the VQI is suitable for?			1	2	5	7
	Very Unconfident	Unconfident	Neutral	Confident	Very Confident
How confident do you feel with using Survey123 to collect data for the VQI?	0	0	0	0	7
How confident do you feel with using the VQI as a teaching resource?	0	0	0	2	5
How can the VQI be improved as a teaching resource?	● More iPads to engage more individual students ● More iPads so students can do it individually/in pairs and be more engaged. ● Some words which the students are unfamiliar with (even 'A' Level students) – 'rugged' and 'hedgerows'. Maybe an information sheet with some images to assist would be useful. Something to go with the iPad with the information on? ● Potential for a differentiated resource for lower key stages, this concept could easily be used from Foundation stage up. ● Once this has been used more extensively in more places, its potential to use as secondary data to compare places and landscapes is huge. ● Whilst not the case at a day centre, follow up work looking at what the categories show us with potential statistical analysis. ● Ways to distribute data and past data to schools.
What support/training would you like to further your understanding of the VQI?	● Bit more background information/context about the survey, aims and the subject of landscapes in general. ● Keen to see results and use these to support using VQI with future groups. ● Brief information sheet to give to the teachers if they are interested about the research - for when they ask how it will be used?

248

249   **Figure 3:** Feedback on the VQI pilot study from Field Tutors at Epping Field Studies Centre

250

5. Trialling the VQI in schools

The VQI demonstrated its usefulness as a tool for 'A'-Level groups whilst conducting site visits with the FSC; it enables students to access and decode landscapes by encouraging them to 'look up as well as down' and to consider more than what is directly in front of them. To further investigate the effectiveness of the VQI as an educational fieldwork tool, we also tested it in three UK co-educational schools with small groups of students studying for 'A' level geography and their teachers. Addressing some of the feedback from the tutors involved in the FSC trial, we developed a VQI Toolkit (for contents, see Figure 4) to brief teachers before they used the VQI in the field with their students. Landscapes assessed were mainly at the edges of school grounds, looking towards rolling countryside characterised by open and closed woodland, farmland or grassland, hedgerows, meadows and views of distant houses with some vertical infrastructure (e.g. pylons) visible in some views. After briefing from a member of the research team, the students' geography teacher led the session in the field during normal school lessons, typically lasting two hours. Following the fieldwork session, feedback was obtained from students and teachers using bespoke questionnaires. Students were asked a range of questions to enable us to evaluate the effectiveness of the VQI as a fieldwork tool. The results obtained from the questionnaires were then coded to allow key aspects of the student experience of the VQI to be established. Two teachers and 28 students provided feedback; in addition, 3 teachers agreed to be provided with the VQI Toolkit and to evaluate it as a teaching tool by completing a short online questionnaire.

5.1 Student feedback

Figure 5 collates the results of the student evaluations of the VQI field survey, post-testing in the field. Students were asked 'what was the VQI trying to help you do?'. Figure 6 Illustrates the four main themes identified in student feedback in response to this question. Students recognised the utility of the VQI for describing and measuring the landscape and some students recognised that it helped them to evaluate and understand landscapes. Comments also confirmed that some students were able to relate the evaluation to the concept of 'place' and the relationship between people and place. Students were asked whether they saw the landscape or environment differently by using the VQI survey' to which 75% of students responded that they did. When asked to elaborate on this by

280 explaining what aspects were new or different for them, three themes emerged from their responses

281 (Figure 7). Students identified functional aspects that were driven by the VQI approach, such as

282 registering key landscape features (e.g., fences, hedgerows, architecture) and a third of students felt

283 that it enabled them to give close attention to the landscape. Some students recognised that the VQI

284 approach made them *think* differently about the landscape and were able to articulate the reasons

285 for this. All students responded positively to a question which asked whether they had enjoyed using

286 the VQI survey and whether they found the experience interesting. When asked about the reasons

287 for this, four themes were evident from their responses (Figure 8). Once again, students picked up

288 on the different perspectives encouraged by using the VQI and the fact that it gave them new ideas

289 about landscape, alongside a new method with which to engage. Fun, interest and enjoyment were

290 recorded as important elements of the experience of using the VQI and several students observed

291 that ease of use helped their sense of enjoyment.

292   The student experience of engaging with the VQI as an approach indicates that it helps them

293 to think differently about the components of a landscape and how those features condition

294 assessments of landscape quality. As found when trialling the VQI with the FSC, participants were

295 able to more readily decode the landscape and to think about the interconnected and

296 interdependent relationships between people and place.

297

5.2 School teachers' feedback

299   The responses from five secondary school geography teachers who tested and evaluated the

300 VQI Toolkit were collated. Two teachers evaluated the approach in the field as a practical exercise

301 with their classes (their students' responses are given in Figures 5-8). The other three teachers were

302 sent the full Toolkit and asked to review all the contents and guidance with a view to using it with

303 their students. Teachers commented that the concept of 'place' in geography was "*crucially*

304 *important, often misunderstood*" and that it is "*an essential part of the A-level curriculum as students*

305 *need to grasp the ways in which place attachment influences peoples' engagement and lived*

306 *experience*". They confirmed that many students struggle when learning about place and find it

307 "*difficult to unpick key concepts*", with the main challenge being that "*students cannot think beyond*

308 *the picture or place, e.g. 'why is it like that?'*". One teacher commented that "*they are able to learn*

309   *factual information about places, but they struggle to see places from the viewpoint of others*". These

310   observations confirm points made earlier in the paper regarding the difficulties that students often

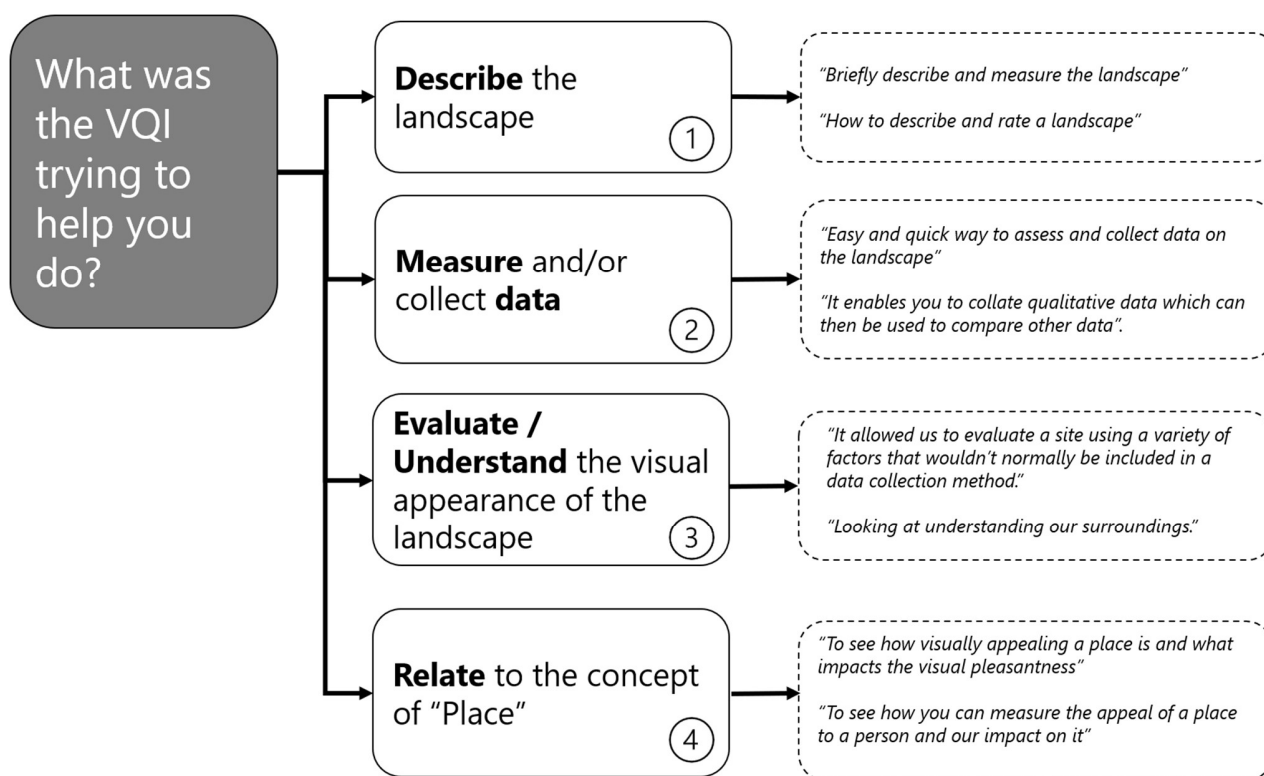311   encounter when learning about place and place-making.

312

1.	Introduction to the VQI (PowerPoint)
This PowerPoint will introduce you to the Visual Quality Index (VQI) and explain its uses.	
2.	**VQI Guidance Notes (PDF)**
The guidance notes talk through the practical element of the VQI, giving examples of how the "VQI Survey Sheet" is used in the field.	
3.	**VQI Survey Sheet (PDF)**
This is the VQI survey tool for use in the field. It contains a set of indicators to be filled out by the students, illustrating the visual quality of each landscape.	
4.	**VQI Instructors Guide (YouTube Link)**
This video demonstrates how to use the "VQI Spreadsheet". As Excel documents are not everyone's forte, this goes through the spreadsheet in clear detail, illustrating how to use the tool.	
5.	**VQI Spreadsheet (Excel document)**
This is an essential tool for the VQI to work. After results are collected on the "VQI Survey Sheet", the results can be collated on the spreadsheet, giving a final value for each landscape – ultimately giving your Visual Quality Index.	
6.	**Scheme of Work (Word document)**
This document, available on a word document or PDF will give you an idea of how the VQI Toolkit can be implemented in the classroom. Feel free to follow this scheme of work or create your own.	
7.	**VQI Films in the Field (YouTube Link)**
Three short films made in the field, to show the VQI put into practice. These films will help solve any issues that you may have with the VQI, as it shows how the surveys are used in the field and talks through what you should do.	

313 **Figure 4:** Contents of the VQI Toolkit supplied to schools.

314

Sample (max = 28)	Question	Result	Notes
28	Did you understand what the VQI was trying to help you to do?	Yes = 27 No = 1	Students understood the purpose of the VQI (see Figure 6).
28	How easy was it to use the VQI survey?	Very Easy = 12 Easy = 15 OK = 1	The design of the survey works on a practical level, all of the students found it manageable to implement in the field and most found it easy.
27	Were there any questions that you found hard to understand?	No = 27	The wording is sufficiently clear. Unsolicited comments included: 1. "Was very clear throughout" 2. "Simply worded" 3. "All well explained."
27	Were there any questions that you found hard to answer?	No = 23 Yes = 4	Comments related to the ability to estimate cover and minor queries 1. "Rating the view in my own opinion" 2. "The % of grassland / urban took a minute to decide" 3. "Sometimes hard to judge the %" 4. "What counts as an historic building?" 5. "Some could be subjective or qualitative"
28	Do you think that you saw the landscape / environment differently by using the VQI survey?	Yes = 20 No = 7 Partly = 1	See Figure 7 for further detail on open-ended responses.
28	Did you enjoy using the VQI survey; was it interesting?	Yes = 28	All the students enjoyed using the VQI (see Figure 8).

315

316 **Figure 5**: Results of the student evaluations of the VQI field survey, post testing in the field (n = 28,

317 not all students responded to every question). Students were drawn from three co-educational

318 schools (13-18 years). After briefing from a member of the research team, the students' geography

319 teacher led the session in the field during normal school lessons. All respondents were aged 16-18

320 and undertaking a geography 'A' Level course. Those questions which invited open ended responses
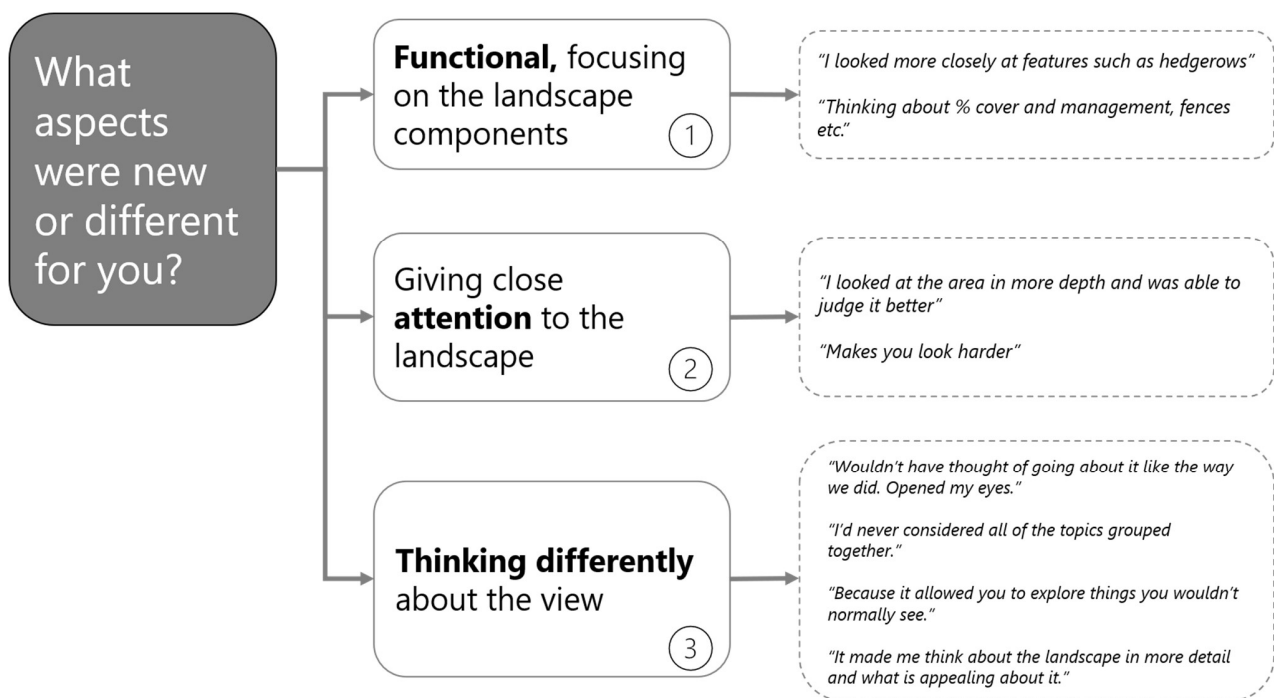
321 are detailed in Figures 6-8.

322

323

324 **Figure 6:** Four themes were identified in the student responses to a question about the purpose of
325 the VQI (n = 21). They are ordered here from 1 to 4 reflecting an increasingly sophisticated
326 understanding of geographical concepts. This ordering also reflects their frequency in terms of
327 student response with (1) Describing = 35%, (2) Measuring = 28%, (3) Evaluating = 25% and (4) Place
328 = 6%, the remaining 6% was made up of a range of comments. Example student quotations are
329 provided for each theme.

330

331

Functional, focusing on the landscape components ①
- *"I looked more closely at features such as hedgerows"*
- *"Thinking about % cover and management, fences etc."*

Giving close **attention** to the landscape ②
- *"I looked at the area in more depth and was able to judge it better"*
- *"Makes you look harder"*

Thinking differently about the view ③
- *"Wouldn't have thought of going about it like the way we did. Opened my eyes."*
- *"I'd never considered all of the topics grouped together."*
- *"Because it allowed you to explore things you wouldn't normally see."*
- *"It made me think about the landscape in more detail and what is appealing about it."*

332

333 **Figure 7**: Three themes were identified in the student responses to this question about what aspects

334 were new for them (n = 21). They are ordered here from 1 to 3 reflecting an increasingly sophisticated

335 understanding of geographical concepts. This ordering also reflects their frequency in terms of

336 student response with (1) Functional = 38%, (2) Attentional = 35%, (3) Thinking differently = 27%.

337 Example student quotations are provided for each theme.

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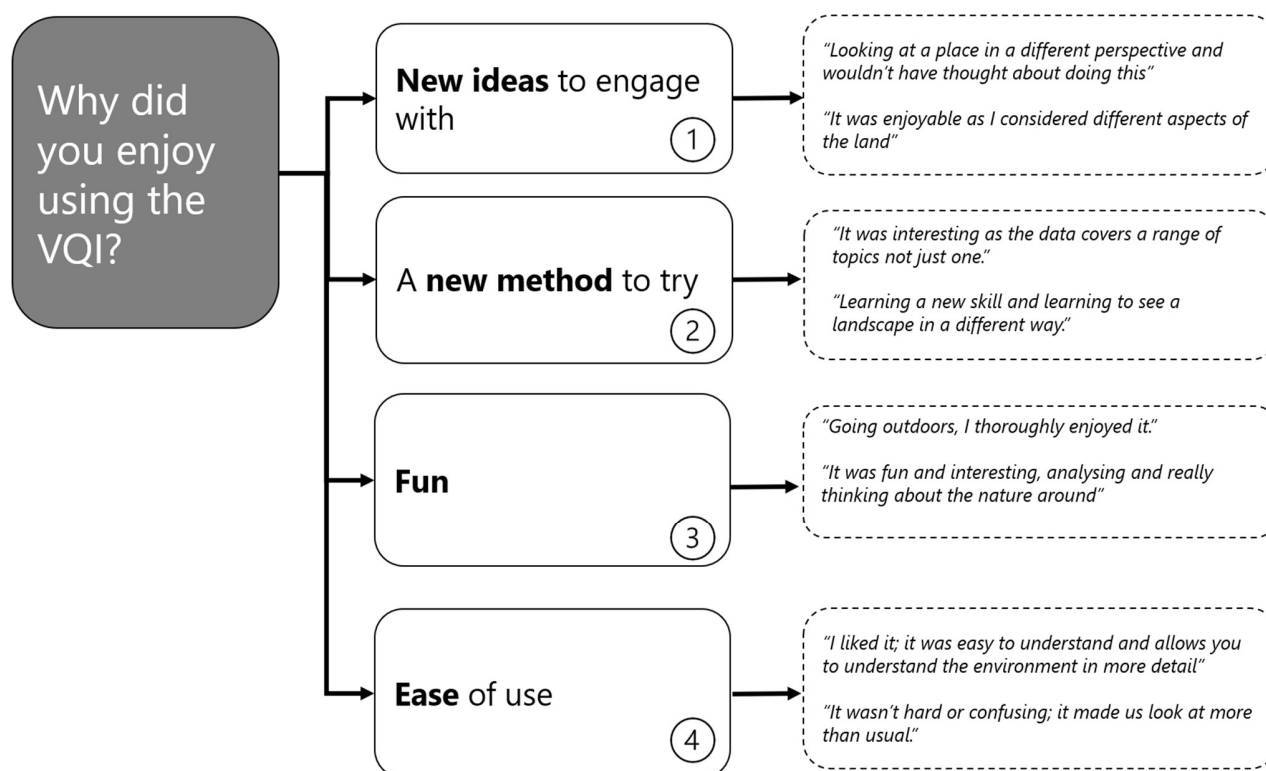
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Figure 8: Four themes were identified in the student responses to this question about the experience of using the VQI (n = 24). They are ordered here from 1 to 4, this ordering reflects their frequency in terms of student response with (1) New ideas = 40%, (2) A new skill/ method = 26%, (3) Fun =20% and (4) Ease of use = 14%. Example student quotations are provided for each theme.

Teachers all found the VQI resources both helpful and easy to use; when asked for specific comments on the VQI Toolkit comments included: *"I found all of the resources provided excellent and well-structured, thus making them easy to follow and teach"*; *"I could happily use these with students who I feel would enjoy this scheme of work and supporting materials"* and *"comprehensive and well explained"*. One teacher remarked: *"This is a really useful tool and can easily be applied into A-level next year and should reduce student disengagement."* Another highlighted the importance of the approach in encouraging students to consider holistic landscape quality: *"I think it forced students to study the landscape and not take features for granted. Often pylons, types of fence and such go unnoticed in their impact on the value of landscapes."* Teachers regarded the VQI Toolkit and approach as an asset to 'A' Level teaching and emphasised its usefulness to the Non-Examined

Assessment (NEA). This is a component of 'A' Level geography comprising an independent geographical investigation with a fieldwork component which is assessed internally by the tutor and then moderated externally. Teachers observed: "*we would have a readymade and user-friendly toolkit for students to collect data efficiently in the field. Students would be able to perform statistical analyses on their primary data which would hit the criteria for the NEA*" and "*this would allow them to make meaningful quantitative comparisons in their independent investigations rather than just discussing generalisations.*"

6. Adapting the VQI to different environments and using the approach

The VQI framework enables changes to be made to the weightings if the index needs to be adapted to suit different landscapes and we encourage people to experiment with this. An equal weighting of 0.2 for each component was agreed as reasonable during the initial stage of adapting the VQI for the FSC. In using equal weights, we are assuming various landscape components contribute equally to overall visual landscape quality. Sensitivity analysis conducted by Swetnam et al. (2017) revealed overall VQI remained stable when changes to landscape category weights remained in the 0.1-0.4 range. If there are prominent features of environments that warrant inclusion in the VQI landscape questionnaire, or if people wish to adapt the tool for use in a location in which landscape components are substantially different, it can be altered to reflect these and the underpinning Excel spreadsheet amended accordingly. This spreadsheet, included in Supplemental Online Materials, is set with an equal weighting of 0.2 for each thematic area; guidelines for setting different weightings are supplied on the sheet. The FSC translated the VQI questionnaire into Survey 123[TM]; there is also clearly scope for other software to be employed to collect the data. Also included in Supplemental Online Materials are a set of VQI Guidance Notes, details of links to an online VQI Spreadsheet Tutorial and links to three 'VQI Films in the Field' all designed to assist those who would like to use the VQI. The VQI Guidance Notes explain how to adapt the VQI to different landscape settings and technologies, but the existing VQI works well in most UK rural and semi-rural landscape settings and our experience demonstrates that it can be readily adopted by schools seeking to enhance their fieldwork teaching.

386   Having established the VQI as a research tool and having adapted it to an educational context,

387   we now offer the approach to geography educators as a fieldwork-ready technique for use in schools.

388   The VQI enables time-series data on landscape quality to be generated from a variety of field

389   locations. It could be used as a thread to tie together locations on a residential field study programme

390   or as part of an investigative method for those seeking to examine a specific environment within a

391   short space of time. Whilst we advocate fieldwork, we present a tool that can be used in both field

392   and classroom-based learning situations in the context of landscape assessment. Critically, it can be

393   a mechanism to provoke discussion about the value of landscapes. Although the VQI questionnaire

394   is designed to be used in the field, it could be used to evaluate images. This could be done as an

395   indoor exercise and then repeated in the field or it could be a way of including students who are

396   unable to participate in fully immersive fieldwork. Images could also be used in circumstances where

397   fieldwork is not possible or where bad weather precludes fieldwork. A field and photograph study

398   could act as a catalyst for examining the differences between the fully immersive and the virtual with

399   discussion of the similarities and differences in the views and perspectives revealed.

400   We see the VQI as contributing to knowledge of place-making and understanding places

401   which are prominent in geography teaching in schools. Given the rural and semi-rural remit of the

402   VQI, it can be used to trigger discussions about the value and influence of both nature and culture in

403   different places - and the agents involved in changing places. Do we like this place? Why do we like

404   it? What makes this place special or unique? Is it welcoming? Is it safe? How easy is it to access? Can

405   people enjoy the natural environment here? If so how? Does this environment need protecting? If

406   so, by what means could that be achieved? What might this landscape look like in the future? The

407   approach has utility as a catalyst for provoking discussions about the contested nature of landscape

408   quality. Why do people find particular landscapes attractive? Do 'known' landscapes prompt

409   different responses to unfamiliar environments? How do places make us feel and why? What makes

410   us value one landscape above another? What agents are involved in changing the nature of a place?

411   Do our landscape quality ratings change with the seasons and if so, how? The VQI could also be used

412   to stimulate discussion about the impacts of biodiversity and rewilding on landscapes. There is also

413   potential for the weighting of the VQI to become a focal point for indoor-based work with students

414   asked to consider the impacts of changing the weightings for given landscapes and to deliberate who

415   gets to decide.

416

417   **7. Conclusions**

418   We are living through times in which young peoples' relationships with landscapes are

419   changing as well as those landscapes themselves. Fieldwork is facing challenges as digital technology

420   and the abundance of secondary information provide easy ways to acquire information. Given the

421   importance of landscapes and the well-articulated benefits of immersive field learning, there is

422   clearly scope for work that encourages young people to engage more holistically with the

423   environments in which they are collecting field data.

424   Having developed and tested an educational tool for assessing the visual quality of

425   landscapes, we now invite its wider use and adaptation. The VQI can be used to monitor landscape

426   changes and the experience of generating the data, as well as the results of the landscape

427   assessment, can be used as a catalyst for discussions about place, landscape aesthetics and appeal,

428   land-use, development and the contested nature of landscape quality. We encourage geography

429   educators to use and adapt the resources that we provide and to communicate with us regarding

430   their experiences of doing so.

431

432   **Ethics statement**

433   The project work reported in this paper comprises i) a pilot study of the VQI as an educational

434   tool which was undertaken through the Field Studies Council (FSC) Epping Forest Centre with full

435   approval from the FSC and ii) a further VQI trial in UK co-educational schools with small groups of

436   students studying for 'A' level geography and their teachers.

437   Consent for fieldwork activities is part of the Field Studies Council's standard operating

438   procedures; consent forms are handled before students visit and all groups involved in trialling the

439   VQI at FSC Epping Forest gave full informed consent. In addition, data acquired from the FSC is

440   protected by a Data Compliance Agreement Form which states that the FSC has the right to use any

441   pictures or data gathered during fieldwork.

442   The VQI trial in schools received ethics approval via full ethical review in accordance with
443   Staffordshire University's ethics procedures. Informed consent was obtained from students and
444   teachers who participated in evaluating the tool as a learning aid for landscape evaluation and
445   students were supervised by their teachers throughout.

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Figure captions

Figure 1: VQI landscape components: terrain, blue-space, green-space, human-influence, historic and cultural

Figure 2: The VQI landscape questionnaire

Figure 3: Feedback on the VQI pilot study from Field Tutors at Epping Field Studies Centre

Figure 4: Contents of the VQI Toolkit supplied to schools

Figure 5: Results of the student evaluations of the VQI field survey, post testing in the field (n = 28, not all students responded to every question). Students were drawn from three co-educational schools (13-18 years). After briefing from a member of the research team, the students' geography teacher led the session in the field during normal school lessons. All respondents were aged 16-18 and undertaking a geography 'A' Level course. Those questions which invited open ended responses are detailed in Figures 6-8.

Figure 6: Four themes were identified in the student responses to a question about the purpose of the VQI (n = 21). They are ordered here from 1 to 4 reflecting an increasingly sophisticated understanding of geographical concepts. This ordering also reflects their frequency in terms of student response with (1) Describing = 35%, (2) Measuring = 28%, (3) Evaluating = 25% and (4) Place = 6%, the remaining 6% was made up of a range of comments. Example student quotations are provided for each theme.

Figure 7: Three themes were identified in the student responses to this question about what aspects were new for them (n = 21). They are ordered here from 1 to 3 reflecting an increasingly sophisticated understanding of geographical concepts. This ordering also reflects their frequency in terms of

494   student response with (1) Functional = 38%, (2) Attentional = 35%, (3) Thinking differently = 27%.

495   Example student quotations are provided for each theme.

496

497   **Figure 8:** Four themes were identified in the student responses to this question about the experience

498   of using the VQI (n = 24). They are ordered here from 1 to 4, this ordering reflects their frequency in

499   terms of student response with (1) New ideas = 40%, (2) A new skill/ method = 26%, (3) Fun =20%

500   and (4) Ease of use = 14%. Example student quotations are provided for each theme.

501

502 **Supplemental Online Materials**

503 **All supplied under Creative Commons Licence**

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506

507 **1.   VQI Guidance Notes (PDF)**

508   File provided

509

510 **2.   VQI Survey Sheet (PDF)**

511   File provided

512

513 **3.   VQI Instructors Guide (YouTube Link)**

514   VQI spreadsheet video: https://youtu.be/e49qAPkG4rk

515

516 **4.   VQI Spreadsheet (Excel document)**

517   File provided

518

519 **5.   Scheme of Work (PDF)**

520   File provided

521

522 **6.   VQI Films in the Field (YouTube Links)**

523   VQI Roaches Video: https://youtu.be/H59K6RooFs4

524   VQI Mow Cop Castle Video: https://youtu.be/YK5ZQ-Z2GRg

525   VQI Chatterley Whitfield Video: https://youtu.be/yrV4_PjmH-4

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