Tutor perspectives on the use of visuals in undergraduate assignments

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Tutor perspectives on the use of visuals in undergraduate assignments

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Aim

• Investigate the writing of L1 Chinese and L1 English students in three disciplines (Biological Sciences, Economics and Engineering).

Outline

1. Establish that there are differences in use of visuals
2. Investigate tutors’ views on this
3. Explore EAP tutors’ views
Background: Framing in academic literacies

Deficit approach

- student writing is ‘remedial’, ‘immature’ and contains ‘problems’ or ‘errors’ - especially L2 English student writing
  
  (Chen and Baker, 2010; Paquot, 2010)

  Vs.

Academic literacies approach

- writing within the academy is a set of social practices in which genre, context and culture are highly significant
  
- highlights ‘the variety and specificity of institutional practices, and students’ struggles to make sense of these’ (Lea and Street, 2006: 376).

- All student writers are in a constant struggle to establish the preferred ways of making meaning within their particular context (e.g. Lillis, 2006).
The data

The corpora

- British Academic Written English (BAWE) & beyond
- All proficient writing
- 58 texts from L1 Chinese students (107,000 words)
- 202 texts from L1 English students (429,000 words)

Interviews & questionnaires

- Interviews with 18 lecturers in Biological Sciences, Economics and Engineering in 6 UK universities
- Questionnaire responses from 200+ teachers of EAP (English for Academic Purposes)
- Interviews with students - ongoing

ESRC project number
RES-000-23-0800
A year 3 Engineering assignment
The role of maternal effect genes in the development of the nematode Caenorhabditis elegans

ABSTRACT

Caenorhabditis elegans (C. elegans) has been used as one of the favourite model organisms for developmental studies. Embryogenesis of C. elegans extensively relies on maternal effect genes for intrinsically asymmetric cell division and cell-cell interactions. In this review, the early embryogenesis of C. elegans, from the establishment of Anterior-Posterior polarity initiated by sperm entry to the asymmetrical cell divisions and different cell lineages induced by a variety of cell fate determinants is summarized, some of the molecular mechanisms carried out by the crucial maternal expressed cell fate determinants underlying these processes are described.

INTRODUCTION

The C. elegans and its life cycle

Caenorhabditis elegans (C. elegans) is a small (~1 mm long) free living soil nematode that has a predominantly hermaphroditic adult life. (Figure 1)

Figure 1 Adult C. elegans [1] Upper diagram: differential interference contrast image of an adult C. elegans. Lower diagram: anatomical structures of adult C. elegans (schematic drawing). Middle Left scale bar: 0.1 mm

The life cycle of C. elegans contains an embryonic stage, four larval stages (L1-L4) and an adult stage. (Figure 2) Molt (apopysis, new cuticle formation, and ecdysis) takes place at the end of each larval stage. Under certain external conditions such as starvation, a non-growing stage, dauer larvae, may form through a facultative, reversible, arrest at the letargus in the second of four cuticle molts. The life cycle is about 2 to 3 weeks. Each

approximately 8,000 C. elegans proteins have already been matched to homologous human gene transcripts (Lai et al., 2000). Specific mutants may be produced by targeted deletion through transposon insertion or mutants. Embryos may be manipulated by transformation or injection with transgenes and marker proteins such as green fluorescent protein (GFP) are easily visualised in the transparent embryos. RNA interference (RNAi) is a particularly useful technique for studying maternal effect genes by eliminating the expression of specific maternal or zygotic genes in offspring.

Reproduction

In hermaphrodite worms, fertilization occurs in the spermatheca - an organ where the sperm is stored - when mature oocytes pass from the ovary towards the vulva (Fig 1A-B). The point of sperm entry determines the posterior end of the embryo. After fertilization, a rigid, oval-shaped chitin eggshell called the chorion is made (Kemphues & Strome, 1997) and the long axis of this ovary is termed the anteroposterior (a/p) axis of the embryo.

Three qualitative variables would have some impacts on the QTMARK, but whether they are statistically significant will be investigated later.

**Correlation matrices:***
- **Example:**
  - The correlation matrix shows that QTMARK has strong positive relationships with variables ABLITY, ALEVELSA, ATTIC, ATTL and strong negative relationships with variables EXAPL and TOPB.
  - The correlation coefficient between ATTIC, ATTL and ATTP is very high. Therefore, multicollinearity is an issue that needs to be addressed.
  - EXAPL has strong negative relationships with ATTIC, ATTIN and ATTL, indicating a strong negative relationship with ABLITY and TOPB. This could be explained by the more TOPB students attend, the more money they spend on alcohol.
  - Generally, HRSQT has strong positive relationships with ALEVELS and ALEVELSA, indicating a positive relationship with ABLITY and TOPB. This could be explained by the more TOPB students attend, the more time they spend revising.

**Bivariate Regression and Multivariate Regression:**

2. **Bivariate Regression**

**QTMARK** = \( \beta_0 \) + \( \beta_1 \) ATTR + u

**Interpretation for the regression results:**
- The intercept \( \beta_0 = 46.97 \) means that even students did not attend any revision lectures, they could get 64.97 in the exam, which may not make much economic sense as revision lectures are designed to boost a student's exam marks.
- The coefficient \( \beta_1 = 0.0022 \) shows an inverse relationship between the attendance of revision lectures and exam performance. It means that a 1% increase in the proportion of revision lecture attendance would decrease students' marks by 0.0022 in the exam.
- If the coefficient of \( \beta_1 = 0.0022 \) is significant, the Interpretation of the coefficient could be that students who attended revision lectures would spend more time revising topics mentioned in the revision lecture and ignoring topics not mentioned in the revision lecture. However, at the coefficient level, we cannot safely state that the coefficient is significant.
- Since the coefficient of \( \beta_1 = 0.0022 \) is small, we cannot safely state that the coefficient is significant.

3. **Multivariate Regression**

**QTMARK** = \( \beta_0 \) + \( \beta_1 \) ATTR + \( \beta_2 \) ABLITY + \( \beta_3 \) HRSQT + u

**Interpretation of the regression results:**
- The coefficient \( \beta_1 = 0.0022 \) is significant at the 1% level, indicating that even students who did not attend any revision lectures, they could still get 64.97 in the exam, which may not make much economic sense as revision lectures are designed to boost a student's exam marks.
- The coefficient \( \beta_2 = 0.0022 \) shows a strong positive relationship between the attendance of revision lectures and exam performance. It means that a 1% increase in the proportion of revision lecture attendance would increase students' marks by 0.0022 in the exam.
- The coefficient \( \beta_3 = 0.0022 \) shows a strong positive relationship between the attendance of revision lectures and exam performance. It means that a 1% increase in the proportion of revision lecture attendance would increase students' marks by 0.0022 in the exam.

4. **Two-tailed t-test for the significance of the slope:**

- **H0:** \( \beta = 0 \) (Proportion of revision lecture attended does not affect exam performance)
- **H1:** \( \beta \neq 0 \) (Proportion of revision lecture attended does affect exam performance)

Since the calculated t-value is higher than the critical value of 2.09 at a 0.1% significance level and 370 degrees of freedom, we reject H0 in this case and conclude that revision lecture attendance does affect exam performance.

**L1 Chinese writer**

**L1 English writer**
Methods

1. Extraction of corpus linguistic keywords and counts of visuals

2. Thematic analysis of lecturer interviews

3. Quantitative and qualitative analysis of questionnaire responses
## Keywords relating to visuals and lists

<table>
<thead>
<tr>
<th>L1&amp; discipline</th>
<th>Chi-Biol</th>
<th>Chi-Econ</th>
<th>Chi-Engin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected keywords</td>
<td>#</td>
<td>growth</td>
<td>#</td>
</tr>
<tr>
<td>table</td>
<td>curve</td>
<td>eq.</td>
<td></td>
</tr>
<tr>
<td>data</td>
<td>refer</td>
<td>according</td>
<td></td>
</tr>
<tr>
<td>equation</td>
<td>model</td>
<td>figure</td>
<td></td>
</tr>
<tr>
<td>figure</td>
<td>per</td>
<td></td>
<td></td>
</tr>
<tr>
<td>graph</td>
<td>output</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A word which is *positively* key occurs *more* often than would be expected by chance in comparison with the reference corpus.
Keywords relating to visuals and lists

Biology
• All "Phases" are labeled on the graph. The curve of the Exponential Phase was straight, though some point lay outside this best straight line of fit (0041a).

Economics
• Actually the total loss resulting from the lower monopoly output (Q M) is the grey triangle. The part of the grey triangle above P C is the loss of consumer surplus (6008q).

Engineering
• According to the program and refer to the figure 4.1.1, it is easy to find… (6107d).
### Visuals

#### Photograph 9 - Tree shrew pollinating the male flower

[Attenborough, 1995]

#### Table 1

<table>
<thead>
<tr>
<th>Carbon Content %</th>
<th>Classification</th>
<th>General Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3-0.4</td>
<td>Low Carbon Steel</td>
<td>General for weld</td>
</tr>
<tr>
<td>0.3-0.7</td>
<td>Medium Carbon Steel</td>
<td>Used for nuts, shafts</td>
</tr>
<tr>
<td>0.7-1.7</td>
<td>High Carbon Steel</td>
<td>Used for applications</td>
</tr>
</tbody>
</table>

#### Figure 7

![Figure 7](image)

#### Figure 8

![Figure 8](image)
Lists and ‘listlikes’

- Sales promotion:
  - Monthly promotions, according to customer sales and current interest
  - Discounts for bulk orders
  - Free P&P on orders over £25, encouraging bulk buying
  - Discounts for new businesses using us for the first time, on condition they use us for a minimum of two more orders

- Public relations:
  - User friendly website
  - Easy search tools within website, enabling you to find the exact bulb you want even for the engineering minded
  - Extensive “Help” and “FAQ” pages
  - 12 hour guaranteed reply to email queries

Conclusions

The experiment yielded the following conclusions:

- The efficiency of a single stage centrifugal pump at high pump speed (3000 RPM) is better than it at low pump speed (2000 RPM).
- The input power with high pump speed increases faster than the one with low pump speed as discharge increases.
- The relationship between total head and discharge is not affected by pump speed, but higher pump speed provides higher total head.
## Counts of visual and list items

<table>
<thead>
<tr>
<th></th>
<th>Tables</th>
<th>Figures</th>
<th>Lists</th>
<th>Listlikes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chi-Biology</strong></td>
<td>15****</td>
<td>25****</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Eng-Biology</strong></td>
<td>5</td>
<td>13</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>Chi-Economics</strong></td>
<td>1</td>
<td>14****</td>
<td>2*</td>
<td>25****</td>
</tr>
<tr>
<td><strong>Eng-Economics</strong></td>
<td>0</td>
<td>12</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Chi-Engineering</strong></td>
<td>10*</td>
<td>21</td>
<td>7</td>
<td>53****</td>
</tr>
<tr>
<td><strong>Eng-Engineering</strong></td>
<td>7</td>
<td>21</td>
<td>10</td>
<td>24</td>
</tr>
</tbody>
</table>

Per 10,000 words

* p<.05
** p<.01
**** p<.0001
Summary… and some questions

Summary
• L1 Chinese students make significantly greater use of visuals and lists than L1 English students
• All BAWE assignments have been judged proficient
• => suggests these are different, yet equally valued, ways of writing

Questions
• Are visuals and lists used as strategies to meet the challenge of producing extended pieces of writing in unfamiliar genres in L2?
• Perhaps some students are more visually-oriented?
• What do discipline tutors think of this greater use of visuals and lists?
• Do EAP tutors teach students how to use visuals and lists as strategies?
Interviews with lecturers 1

Importance of visuals

• Diagrams and formulae are ‘the spine of the essay’ (Economics)
• The ‘challenge’ is ‘to marry the diagrams with the text’ (Economics)
• Including visuals helps students gain better marks as it avoids having to describe and introducing errors (Biology)
• Marks for presentation may include the assessment of diagrams, tables and overall layout (Engineering).

Being concise

• Preference for ‘precision, incision, concision’ (Economics)
• ‘there’s never been a penalty for an essay that’s too short’ (Biology)
• Good writing is ‘clear’, ‘concise’; and dislike ‘verbosity’ (Engineering)
• British ss ‘use too many words’ - ‘don’t use 10 when you can use 5’.
• Proforma may say ‘include a table here’. May be given font sizes, margin size, line spacing, ‘so people can’t cram in words’.

Interviews with lecturers 2

Bulleted lists are ok

• ...but the words have to be ‘particularly good’
• ‘easier to mark if bullet points’
• in exams, bullets are ‘ideal’ not paras. ‘no need to dress it up as an essay’. Be straightforward. (Engineering)
• ‘Gives visual emphasis’.
• ‘essay questions allow you to hide the things you don’t know.’ (Economics)

‘Maths-oriented’ and ‘journalistic’ students in Engineering and Economics

• 2 types of student – ‘maths-inclined student who would be happy putting bullet points instead of prose’ and students who are good at writing prose but ‘not as strong mathematically’.
• students see essays as a ‘refuge from problem-solving questions’ (Economics)
• ‘graphic literacy’ is seldom taught in writing classes – why?

• Most applied linguists are ‘trained in the humanities, where words are central to disciplinary values and argumentation’ Johns (1998:183)

• Tutors may ‘find themselves relying on disciplinary norms they are familiar with’ (Gardner and Holmes, 2009: 251)

• There’s often a concentration on ‘linear text’ (Johns, 1988: 183) rather than on the interaction of visuals with text.
Survey of writing tutors

- 219 responses
- 87% of respondents teach in universities
- 60% have been teaching for 10 years +
- 50% + have a Masters degree in Applied Linguistics or Education
- 20% teach at foundation level, 36% UG in-sessional, 34% postgraduate
- Teach a mix of L1 English only, L2 English only, and both L1 and L2 English students
Students' disciplines

Tutors' disciplines

- Business and Management
- Arts and Humanities
- Social Sciences
- Education (including Linguistics)
- Engineering, Technology and Design
- Science
- Computing and IT
- Health and Social Care
- Environment, Development and International Studies
- Law
- Mathematics and Statistics
- Languages
- I'm not sure what category to choose/I don't know
Teaching the use of visuals

- ‘The visuals are too complicated and student specific for me to know thoroughly and they know them better.’
- ‘I don’t know much about their individual subjects - just general knowledge or what I pick up from them.’

- ‘On the preessional course in the UK I taught on, lists were certainly discouraged and little explicit attention was paid to integrating visuals into writing.’
- ‘I have students do an ethnography of writing in their field, so that they can answer these questions.’
- ‘We are often quite detached from the disciplines because our students go into so many different spaces after completing foundation’
- ‘Some students are permitted to use these features and some not, so for this reason it is not sensible to teach them.’
Implications for practice: Writing tutors

• remain open-minded as to what might be acceptable;
• include ‘graphic literacy’ in academic writing classes;
• research writing in their discipline (cf. Johns', 1997, plea for students to become researchers of their disciplines' practices);
• search corpora (e.g. BAWE, MICUSP) for particular discipline features;
• collect exemplars of the writing their students are asked to produce;
• move beyond lexicogrammatical considerations such as the acceptability of I or the choice of passive or active voice to considering assignments holistically
  (e.g. Is it ok to use a table to display results or should these be given in prose? Can the conclusion be presented as a bulleted list? If images are given, can a lengthy caption be included?);
References