Human fieldwork: Llandudno

Fieldwork enquiry question:
Does tourism affect the environmental quality at Llandudno?

Hypothesis and aims:

The aim of the investigation was to discover whether tourism at Llandudno has meant that there is more investment at the promenade. Hypothesis: Environmental quality will decrease with distance from the promenade in Llandudno.

Reason location is suitable for physical enquiry:

The location was chosen as Llandudno is a popular tourist destination attracting 300,000 visitors a year who spend ~£90 million/year. The area is also easily accessible from our school at just a 2 hour drive. Llandudno is a small enough seaside town that the risks associated with fieldwork are reduced and we will be able to collect sufficient data in order to test our hypothesis in the limited time frame.

Method: Bipolar Environmental Quality Survey

Sampling method: Systematic sampling (fixed sites)
Sample size: 5 transects running along streets moving away from the promenade. Each transects had 5 sites along it, starting at the promenade and moving inland away from the promenade.
Description: Created a bipolar survey which has a scale from -3 to +3 for a number of environmental factors including the safety, litter, friendliness and building quality. Each site was visited and the factors were scored from -3 to +3. Gives quantitative data.

Strengths:
-Sites were chosen based on **secondary data via an OS map** and secondary research of Llandudno.
- Using a score system which goes from -3 to +3 enabled the negative aspects of sites to be clearly shown.
- Easy to conduct and collect data in the field in a limited time period
- Calculated an average to try to make scores more reliable.
-A range of factors was assessed at each site to ensure that the results gave a clear picture of environmental quality.

Weaknesses:
-The score given is based on an opinion- it is subjective so different people may not agree with the results we collected.
- All data was collected by students of the same age group (14-15) and therefore results may not be representative for how the general population feels. E.g. elderly may have a different perception of how attractive the buildings are.
-Lack of sites surveyed- so conclusion based on a small area.
- Some factors being assessed were not appropriate for site.

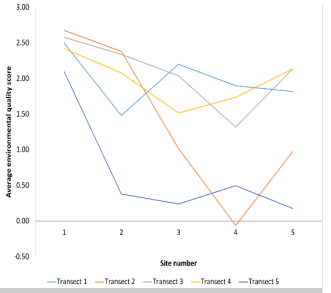
Negative criteria	-3	-2	-1	0	+1	+2	+3	Positive criteria
High risk, busy street, no crossings								Very safe for pedestrians
Dirty, litter problem								Clean, no litter
Dilapidated buildings, in need of attention								Attractive and well maintained
Many vacant premises/sites								All properties occupied
Unfriendly								Friendly

Risk assessment

Busy roads	Risk of accident by walking along and crossing busy roads in the town.	Students told to only cross the road at the crossings and walk in pairs encase of accident.
Injury	Risk of injuring through walking around the town such as tripping.	Students told to walk around the town in pairs or more. Each group carried a first aid kit and so did the teacher.
General public	Risk of verbal abuse from members of the public especially when carrying out questionnaires. Also risk of abduction.	Students told to walk around in pairs or more. Meeting point given to students to meet at regular times and a head count to be done. Students to be polite when asking questionnaires.

Presentation method: Line graph of environmental quality with distance from prom

Strengths	Very clearly shows how environmental quality changes with distance from the promenade. Clear to see the highest and lowest values. Easy to plot and able to identify any trends as the site number increases.
Weaknesses	Does not show where in Llandudno each site is. Doesn't help to explain the results or give the actual distance from the promenade.
Alternative presentation techniques	Located bar graphs on a map of Llandudno to visually show where the highest environmental quality scores are in relation to the promenade.



Presentation method: annotated google street view photos

Strengths	Shows the features along the different transects and any environmental factors which may help to explain the results. Also allows us to judge what the promenade looked like on a totally different day.
Weaknesses	There is no control over what time of year / day the photos were taken and they therefore may not be representative for all year. E.g. streets may look deserted in winter but this could be totally different in summer, or if photos were taken first thing in the morning there may be more litter by mid afternoon.

Results and analysis

The results show that for each of the transects the highest average environmental score was at site 1, at the promenade. This is likely a result of the investment in the area as this is the point where most of the tourism is focussed and therefore businesses and the council invest in this area to maintain the number of tourists visiting the area. This is shown by the fact that the **promenade at site 1 scores highest** for **street safety, building quality and friendliness**, especially at **transect 2** which scored an average environmental quality score at site 1 of **2.68**.
All transects show a significant drop in their average environmental quality score as you move away from the promenade. **Transect 2** at **site 4** gets the lowest average score of **-0.06** and this is likely due to this site being located next to an unpaved carpark situated on a busy road.

The results of **transects 2, 3 and 4** show an increase in environmental quality at **site 5, furthest away from the promenade**. This may be a result of the location of these sites. As **transects 3 and 4** both rise to **2.14** at the furthest site from the promenade as they are both located next to large open parks or playing fields and this is likely to increase the environmental quality. Also, Llandudno could see results which do not totally match the hypothesis due to its geographical location. Llandudno does not have just one beach front but has two. Therefore, as you move away from the main promenade, you move towards the other beach front. This could account for the rise seen by the bipolar survey.

Conclusion

It is evident from the results that the hypothesis can be partly accepted. The results clearly show that the environmental quality is highest at the promenade where tourists spend a significant amount of time. This shows how tourism can have a positive impact on the environmental quality. However, our results could be complicated by the existence of two beaches.

Sources of error	Impacts on quality
Sample size	Smaller sample sizes usually means lower quality data.
Frequency of sample	Fewer sites reduces frequency, which then reduces quality.
Type of sampling	Sampling approaches may create 'gaps' and introduce bias in the results.
Equipment used	The wrong / inaccurate equipment can affect overall quality by producing incorrect results.
Time of survey	Different days or times of day might influence perceptions and pedestrian floes, for example.
Location of survey	Big variations in environmental quality can occur between places very close to each other.
Quality of secondary data	Age and reliability of secondary data affect their overall quality.

Evaluation

Sample size	The EQS did not show a full representation across Llandudno- thus the conclusions are based on a small area and this therefore impacts the relevance of our results.
Bias	The EQS is based on opinion we only completed the survey based on the opinion of one particular age group.

Fieldwork enquiry question: Does the Afon Ogwen get wider and deeper with distance downstream?

Hypothesis and aims:

Hypothesis: A testable statement.
The Afon Ogwen gets wider and deeper with distance downstream.
The river will get wider from its source to its end due to increasing lateral erosion as the amount of water in the river increases.
The river will get deeper from its source to its end due to increasing vertical erosion as the amount of water in the river increases.

Reason location is suitable for a physical geographical enquiry:

The Afon Ogwen was chosen because:
- All stages of the course of the river are able to be visited in one day as the A5 follows the valley, we can access all areas.
- The size of the river at each stage is suitable for measurements to be taken.

Method 1: River channel width

Sampling method: Systematic sampling as sites roughly evenly spaced along the course of the river
Sample size: 16 sites (Some in upper, middle and lower course)
Description: Hold the tape measure across the surface of the water, measuring the width of the water from one bank to the other.

Strengths	Weaknesses
-The method of data collection is simple to carry out. -The equipment allows accurate measurements to be taken.	-Taking only one reading at each site could reduce the reliability of the measurements if the location measured was not typical of the river at that stage – to increase the reliability you could average the results from each group to give an average width for each stage of the river.

Method 2: River channel depth

Sampling method: systematic sampling (fixed intervals across the river channel)
Sample size: Same **16 sites** (upper, middle and lower course)
Description: Hold the tape measure across the surface of the water, from one bank to the other. Measure the depth of the water every 10% across the width using a 1 metre ruler. (calculate cross section)

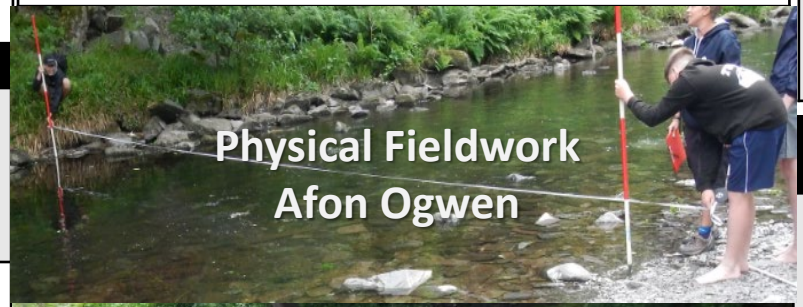
Strengths	Weaknesses
-The method of data collection is simple to carry out. -The equipment allows accurate measurements to be taken. - **11 readings per site** allows cross section to be analysed NB make sure that you hold the ruler so the flat side is perpendicular to the river flow – this makes the readings more accurate.	-Time consuming and some mathematical skill required to calculate the measurement intervals at each site. - Influenced by site choice

Risk assessment

River channel	Risk of falling over and injuring yourself in the river, or, in the worst case scenario, drowning.	Walk carefully and watch your step when in the 'field'. Listen to teachers' instructions about where the banks may be unstable and avoid these areas.
River water	Risk of toxicara and Weil's disease	Wash hands with soap and water following any contact with the river water and before eating or drinking.
Weather	Wet weather is dangerous due to slippery rocks etc. Hot weather also poses the risk of dehydration.	Students advised to bring plenty of water and sun cream if the weather forecast is hot. If the weather forecast is wet, students are advised to bring appropriate clothing and footwear.

Results and analysis

River width	The results show that river width does increase as you move downstream in the Afon Ogwen. Width increased by 26.9m overall. The pattern is not uniform This supports the hypothesis from the Schumm Model. This is explained by an increase in lateral erosion (hydraulic action)due to an increasing volume of water in the river as you go downstream. This water mainly comes from tributaries that join the river along its course.
River depth	The results show that river depth does increase as you move downstream in the Afon Ogwen Valley. Depth increased by 0.97m This supports the hypothesis from the Schumm Model. This is explained by an increase in vertical erosion due to an increasing volume of water in the river as you go downstream. This water mainly comes from tributaries that join the river along its course.



Presentation method 1: Scatter graph with line of best fit

Strengths	Very clearly shows that width increases as you move downstream from **1.1m to 28m at site 12**. Easy to see the pattern and compare data sets. Anomalies are clear. Using the average (mean) width at each site increases reliability. Shows correlations between data.
Weaknesses	Hides variability in the width at each site so loses accuracy of results.
Alternative presentation techniques	Proportional flow arrows in the direction of the river flow could have been used to show how wide the river was at each stage.

Presentation method 1: Scatter graph with line of best fit

Strengths	Very clearly shows that depth increases as you move downstream from **0.02m to 0.99m** at site 16. Easy to see the pattern and compare data sets. Anomalies are clear. Using the average (mean) width at each site increases reliability. Simple to construct.
Weaknesses	Hides variability in the depth at each site so loses accuracy of results.
Alternative presentation techniques	Located cross sections could have given a clear visual representation of the changes in the channel depth and shape.

Conclusion

It is evident from the results that the Afon Ogwen partly matches the Schumm Model and expectations in terms of increasing river channel width and depth as you go downstream. This increase is not uniform along the course and place specific detail can influence the impact of erosion and deposition. E.g. a bridge foundations and tidal zones.

Hypothesis: The Afon Ogwen will become wider and deeper with distance downstream. Our results suggest this is TRUE.

Evaluation

We only visited one river on one day so we could have found different results if we had visited on a different date due to the changing geomorphic processes influencing the river. Perhaps returning and measuring the same sites could make results more reliable.
Opportunity to use alternative equipment, such as a laser (for width) may have improved accuracy by millimetres but unlikely to change the overall conclusion.
Generally we have reliable results and therefore have formed valid conclusions supported by statistical evidence (Spearman's Rank)
Also not all rivers are the same so we cannot generalise our results to all rivers. Therefore conclusions are based on limited data.