Model	Predictive Performance					Linguistic Quality		
	BLEU-1 ↑	BLEU-2 ↑	BLEU-3 ↑	BLEU-4 ↑	F1-Score ↑	Perplexity ↓	Diversity ↑	Grammar Errors ↓
Leaf (Baseline)	27.07	20.22	17.17	16.46	30.90	**30.82**	0.735	**0.102**
EduQG (Ours)	**29.19**	**21.69**	**18.03**	**16.76**	**33.18**	34.36	**0.749**	0.122

Table 1: Comparison of predictive performance and linguistic quality between Leaf (baseline) and EduQG (our proposal). The superior performance is indicated in **bold** face.

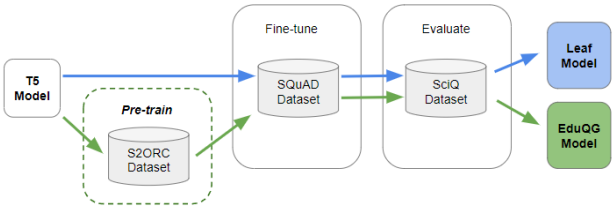

Figure 1: Baseline (blue arrows) and EduQG (green arrows).

fine-tune the T5 model with a down-sampled version of the S2ORC dataset that contains approx. 23.2M scientific abstracts related to Chemistry, Biology and Physics research papers (green dashed box in figure 1).

Evaluation The two settings lead to the baseline (Leaf) and the proposed model (EduQG) that we compare using the SciQ dataset, as it contains exclusively educational questions. To measure the predictive power of the human-generated questions, we use the BLUE score and the F1 score (**?**). To measure how human-like the generated questions are, we use perplexity, diversity and grammatical error rates. A lower perplexity score indicates better coherence (**?**).

Preliminary Results and Discussion

The results of the model comparison are presented in table 1. The predictive performance results in Table 1 clearly indicate that the *EduQG* model is better at predicting scientific questions based on the context compared to Leaf. This is a strong indication that the additional scientific knowledge the EduGQ model is pre-trained on has an effect on educational QG capability. However, the linguistic quality metrics (shown on the right of the table) do not yield a favourable result although diversity has been improved by our model. We hypothesise that this may be due to the mismatch of language style and vocabulary of a scientific language that is advanced and complex. Therefore, scientific language might not align seamlessly with the reference models used for linguistic quality assessment.

Conclusion

This work introduces EduQG, a foundational step toward further pre-training to improve educational QG. Our initial experiments prove the utility of pre-training an existing language model to improve its performance. The linguistic quality metrics are not as favourable as expected. Deeper analyses are warranted to understand whether the outcomes portray a limitation or a mismatch between the language models which will be addressed in future work using both offline and human studies.

Acknowledgments

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