

Educational seismology in Nepali schools: tailored solutions to start a program

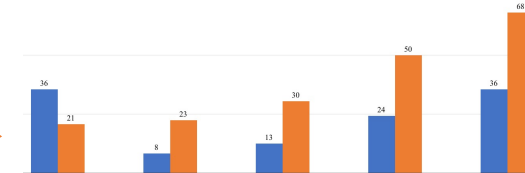
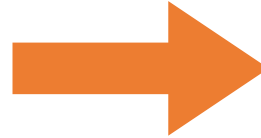
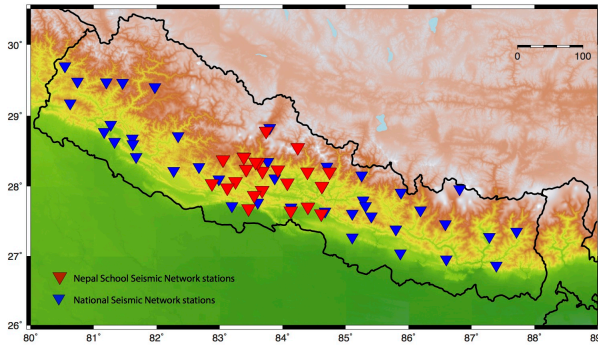
Shiba Subedi¹, György Hetényi¹, Paul Denton² and Anne Sauron³

¹Institute of Earth Science, Faculty of Geosciences and Environment, University of Lausanne, Switzerland

²Denton Seismo Ltd., Oakham, United Kingdom

³HES-SO Valais-Wallis, Sion, Switzerland

Graphical abstract



A part of this work is under review in Geoscience Communication

<https://www.geosci-commun-discuss.net/gc-2020-25/>

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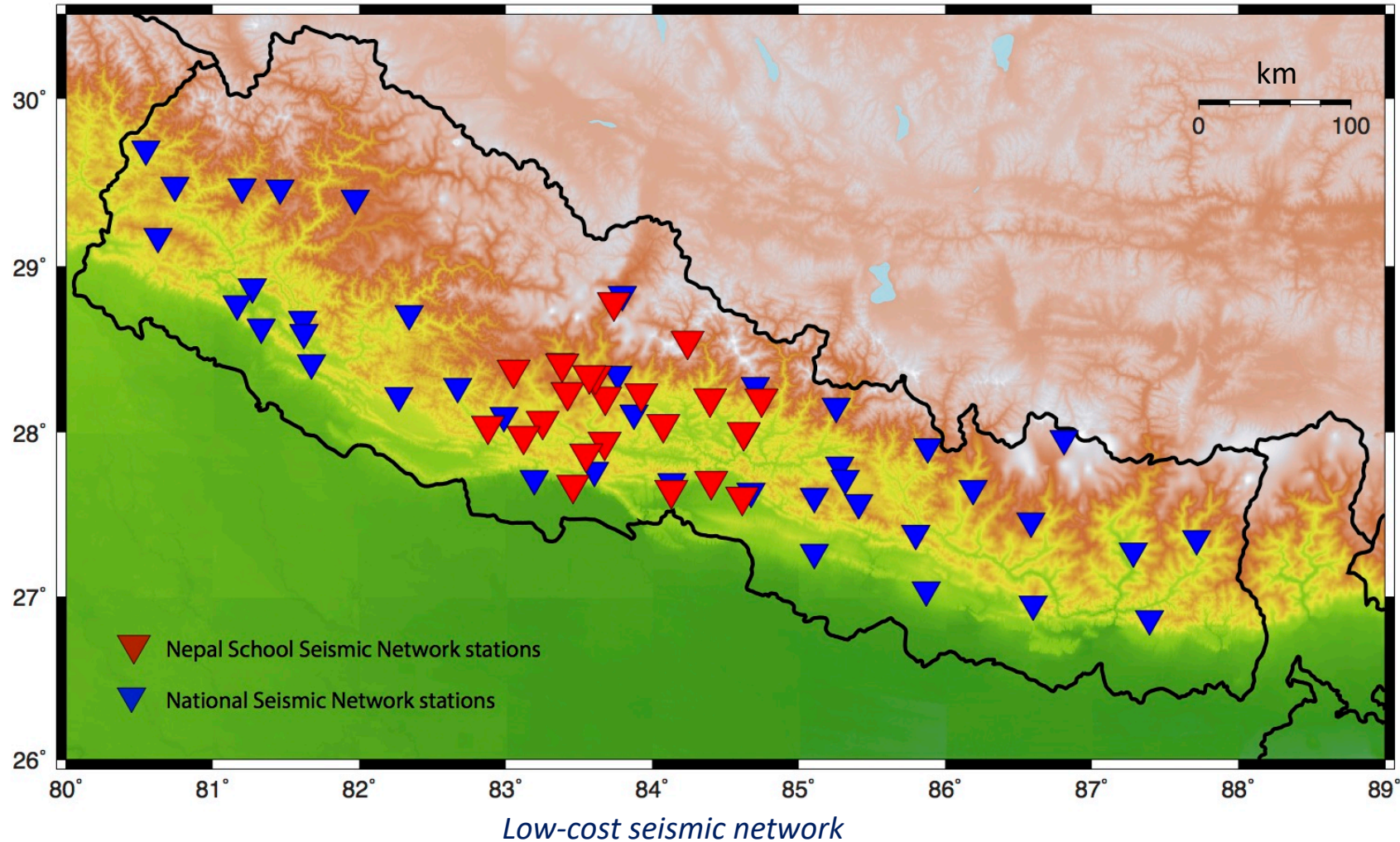
Shiba Subedi¹, György Hetényi¹, Paul Denton² and Anne Sauron³

Text abstract: We have established an initiative in Nepal to introduce seismology in schools, which relies on two pillars: a [low-cost seismic network](#) with stations installed in schools, and educational activities in schools on earthquakes and the related hazards. For classical teaching, we have prepared educational materials adapted to the Nepali school system, levels and language. By using these materials, not only students in the schools but also local people in the community can learn earthquake education and follow guidelines for better preparedness. For efficient implementation, we have organized a 2-day workshop for the school teachers to prepare them for the new teaching, which was presented by experts in the field and included lots of discussion to find the adapted level. Moreover, during our field visits, we give special lectures and also perform earthquake drills at schools.

Well-prepared educational materials such as flyers and stickers are distributed to students, and demonstration tools for physics to schools. All the material from our project is freely available on our [program's website](#). We have started the program by choosing 22 schools in the region, and establishing direct contact with the teachers, principals and the local communities. We found this was an efficient way to implement the project, especially in rural areas. The preliminary and personal feedbacks reflect that this program is well received. A survey-based evaluation on the program's impact on the local community has been carried out and the results are presented. We hope that the project is able to help this region to prepare for future earthquakes, and we seek that the initiative is spread to other regions to make earthquake-safer communities across Nepal.

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A low-cost seismic network



Selected sensor: Raspberry Shake 1D

- A low-cost seismic network has been installed at schools in western Nepal

Educational materials

१ भुकम्प जानुपर्वका तयारी

सुरक्षित ठाउँ पत्ता लगाउनु

तपाईं आफैलाई सुरक्षित गर्नको लागि सुरक्षित ठाउँहरू खोज्नुहोस् – टेबलमुनी अथवा बेन्चमुनी वा दोस्रोको फ्रेम आदी ।

वरीपरी हेर्नुहोस्

दाहल वा झुपडाहरूको समानहरू राम्रोसँग पछिल्लो/बिचको/अघिल्लोको छुट्टिन चेक गर्नुहोस् । अरुको ठाउँमा भएका गद्दा सामानहरू हटाउनुहोस् । पानीका भाँडा प्यास चुली र बिजुलीका स्विचहरू कहाँ छन् याद गर्नुहोस् ।

अत्यावश्यक सामग्रीको तयारी

अत्यावश्यक सामग्रीको किट (Kit) तयार गर्नुहोस् र सजिलै उपलब्ध हुने ठाउँमा राख्नुहोस् । अत्यावश्यक सामग्रीहरू पानी/लाभो समयसम्म नकुट्टिने खानेकुरा / फस्ट एक किट/सानी ज्यादी/ टर्चलाइट ज्यादी सहित/ ताली कपडाहरू/ब्यान्डेज/आफ्नो पर्सको दिने कागजको प्रतिलिपी/ केही पैसा आदी ।

आफैले अघ्यास गर्नुहोस्/ तालीम लिनुहोस्

आधारभूत जीवन रक्षा विधिसँग अभ्यस्त हुनुहोस् । यदी परिवारका सदस्यहरू फाँक फाँक ठाउँमा हुनुहुन्छ भने आपतकालिन अवस्थामा छुट्टी ठाउँ तय गर्नुपर्नेछ ।

२ भुकम्प जाँदै गर्दा

कहिले र कहाँ जाने ?

पहिलो झटका अनुभव भएको जतिबित्तो छिटो पहिले छनौट गरेको सुरक्षित ठाउँमा जानु होस् । भर्षाङ र लिफ्ट प्रयोग नगर्नुहोस् । यदी भवनको बाहिरी हुनुहुन्छ भने अलिक टाढा जानुहोस् ।

आश्रयस्थल पत्ता लगाउनु

१ तल जानुहोस् २ आश्रय लिनुहोस् ३ बलिचोसँग समानुहोस्

यदी तपाईं विद्यालयमा हुनुहुन्छ भने तुरुन्तै टेबलमुनी आश्रय लिनुहोस् । टेबलका खुट्टाहरू बलियोसँग समानुहोस् भुकम्प जाँदै गर्दा टेबलहरू सँगै राख्नु ।

भवन बाहिरको जोखिम

यदी तपाईं भवनबाहिर हुनुहुन्छ भने बाहिरी बस्तुहरू र भवनभन्दा टाढा जानुहोस्, उच्च विद्युत तारहरू वा अन्य वस्तुहरू खस्न सक्ने ठाउँभन्दा टाढा जानुहोस् । भिगलो ठाउँबाट टाढा जानुहोस् भुकम्पले पहिरो जाँस् सक्छ, ढुङ्गा खस्न सक्छन् ।

कारभित्र/बसभित्र

यदी तपाईं कार/बसभित्र हुनुहुन्छ भने खुल्ला ठाउँमा रोक्नुहोस् सवारी भित्र नबस्नुहोस् । फुरमाथो तथा आकाशो फुलमुनी पार्किङ नगर्नुहोस् ।

३ भुकम्प पछाडी सतर्क रहनुहोस्

भुकम्पको झड्का सकिँदा बित्तिकै

जब पहिलो झड्का रेकिन्छ, यदी सम्भव छ भने पानी/प्यास र बिजुली बन्द गर्नुहोस् । अत्यावश्यक सामग्री लिनुहोस् र भवनबाट बाहिर निस्कनुहोस् ।

सावधानीपूर्वक बस्नुहोस्

चेतावनी ! पछाडी भुकम्प पछाडी अरु कम्पनहरू पनि आउँन सक्छन्, जसलाई पराकम्पन भनिन्छ । कम्पनको कारणले उभान हुने अन्य जोखिमहरू जस्तै पहिरो, बाढी, आगोलागीको बारेमा सचेत हुनुहोस् ।

मेडिकल केयरको सुनिश्चित गर्नुहोस् ।

तपाईं आफ्नो चोट जाँच गर्नुहोस्, तपाईंको वरीपरी यदी कोही जटिल र अड्क्यारी अवस्थामा देख्नुपरी भने सहायोग गर्नुहोस् । अन्य जानकारीका लागि र निर्देशनहरूका लागि रेडियो/टेलिभिजन सुनुहोस् ।

अत्यावश्यक सेवाहरू

आफ्ना साथी र परिवारलाई बाताप्यास सम्पर्क गरेर टेढोफेन लाग्नु नयाँ अवस्था हो । आफ्ना परिवारका सदस्यलाई सम्पर्क गर्न सकिने ठाउँमा रहेको छ ।

Flyer on what to do before, during and after an earthquake



Earthquake awareness sticker

- Educational materials adapted to the Nepali school system and distributed to students

Workshop for teachers



Seismometer demonstration for teaching purposes



Teachers attending workshop

- A 2-day workshop has organized for the school teachers to prepare them for the new teaching, which was presented by international experts in seismology and education

Educational implementation



Seismometer installation in a school



Explaining the emergency assembly sign

Educational implementation



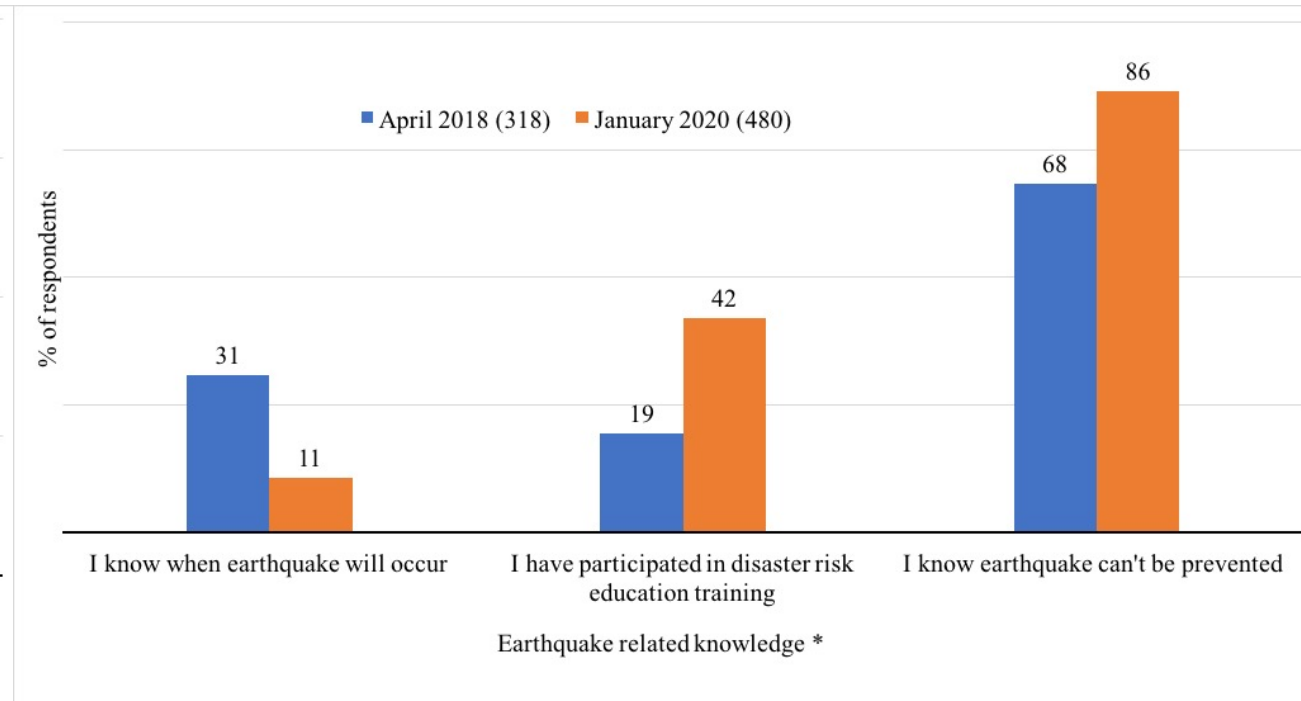
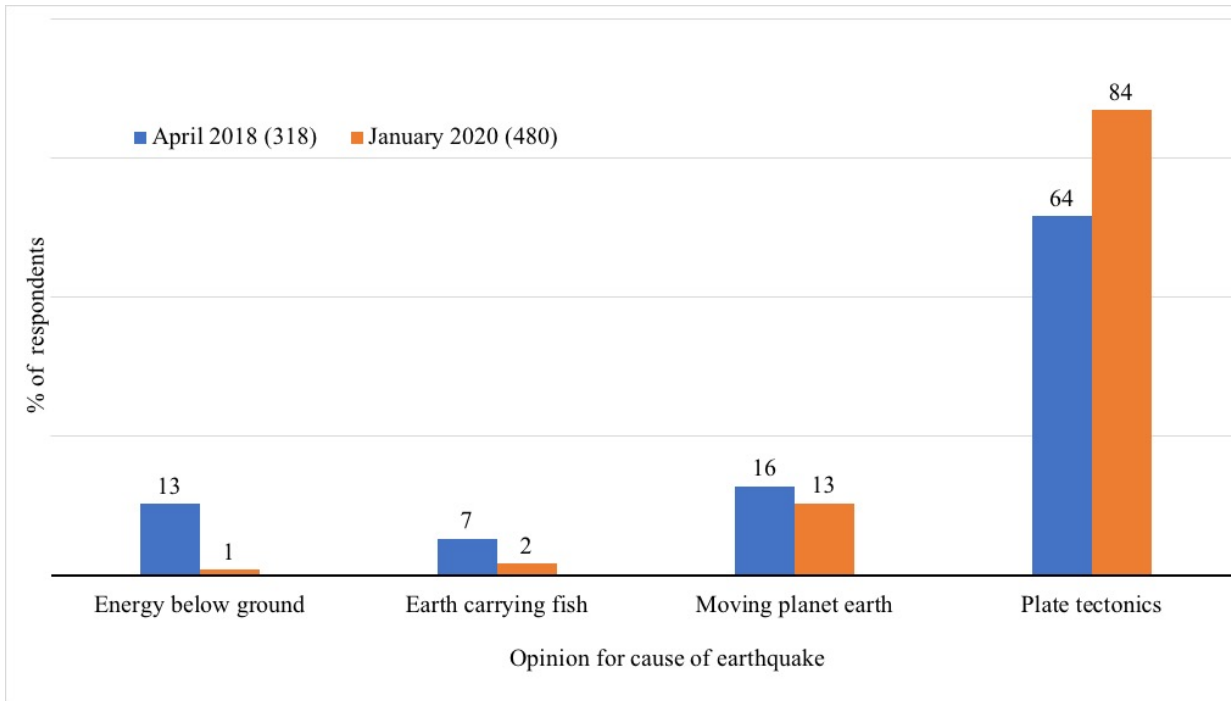
Information spreading in morning assembly



Sample lecture in school

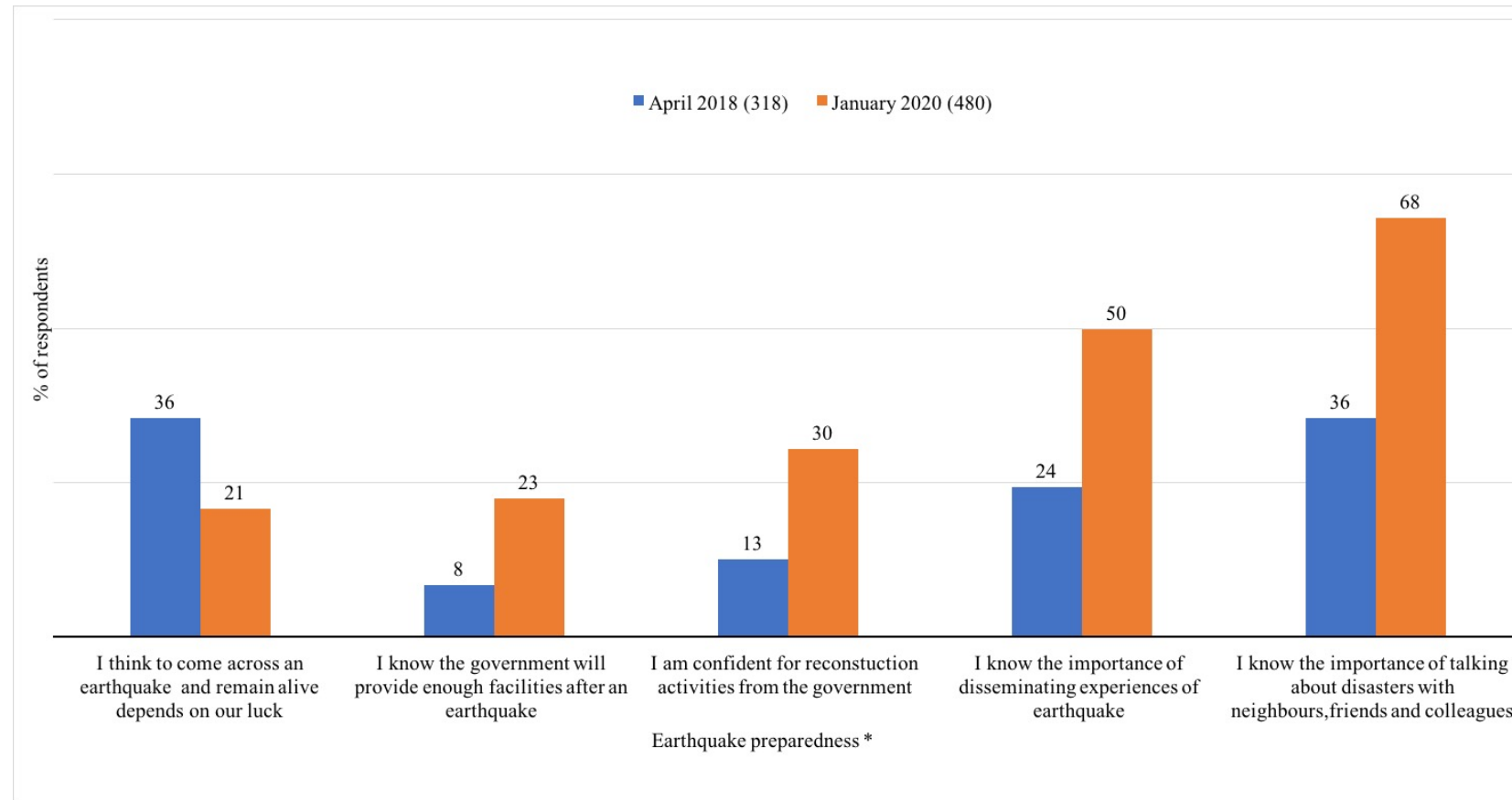
- Special lectures using educational materials were delivered.

Impact on earthquake knowledge



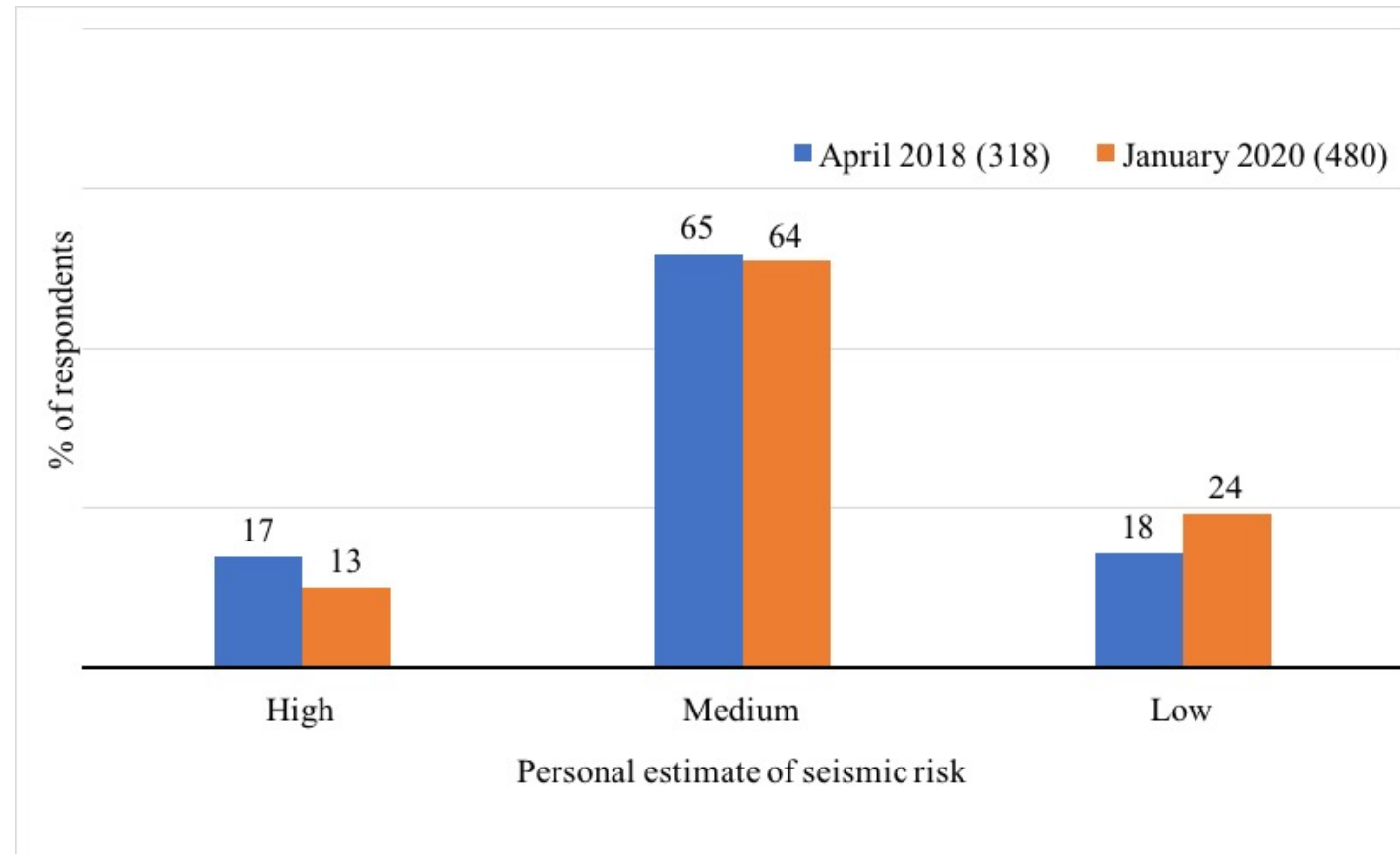
- Two questionnaire surveys have been carried out (before and after the initiation of our educational program)
- Results show that the earthquake related knowledge has significantly increased among students

Impact on earthquake preparation



- Students are much better prepared after the initiation of our educational program

Risk perceptions



➤ Perceptions of risk has not (yet?) changed

Conclusions

- ✓ The Seismology at School in Nepal program has been successfully implemented and achieved the aim of raising earthquake awareness and preparedness
- ✓ The program itself and the methods we used for teaching about earthquakes and demonstration with low-cost seismometers are well accepted
- ✓ The new knowledge learned by the students at school reaches their parents and is transferred into the local communities
- ✓ The results we observed through two surveys, before and after initiation of the education program, are measurable, statistically significant and with positive changes for earthquake related knowledge and preparedness level, but not (yet) for the perception of the related risk
- ✓ A high and positive impact of the program on the students and their communities is encouraging for the continuation and expansion of the program in the region

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