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學術對談

思辨 AI 的社會生命：跨學科對話的力量

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「社會技術問題有兩個面向——社會與技術——你需要來自這兩個領域的代表，甚至可能還需要更多。跨學科合作是必要的，是我們所有工作開展的根基。」——安德烈亞．塔皮亞教授

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「今天，AI正在改變怎麼樣的人類行為？想像一千年後，人們回顧這一代時，他們會怎麼說AI在如此短的時間內改變了我們？這讓我很感興趣——科技接受與行為變遷的機制。我們究竟在打造怎麼樣的數字未來？更重要的是，每個人對未來的想像，因背景與經歷而異。這就是我專注於理解AI如何與人類的想像力產生相連的原因。對人類來說，想像力是一種奢侈，只有在滿足基本需求後才能擁有這種能力。而AI正在快速改變我們的想像力與需求，特別是在數字未來的塑造上。從這些角度看，科技與人的互動未來仍有非常多令人興奮的研究領域。」——鍾布教授

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Dialogue

Interrogating the Social Life of AI: The Power of Interdisciplinary Dialogue

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Abstract

The conversation explores the evolving social life of artificial intelligence (AI), foregrounding the ethical, behavioral, and epistemological stakes of emerging technologies at the intersection of communication and information science. Through critical reflections on crisis informatics, trustworthy AI,

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organizational adaptation, and inclusive design, the dialogue underscores the vital role of interdisciplinary collaboration in navigating complex socio-technical challenges. It calls for a renewed commitment to responsible innovation, the protection of human agency in AI-mediated systems, and the development of data infrastructures that recognize and respond to social diversity. Ultimately, the exchange affirms the indispensable contribution of communication scholarship in shaping a more just, inclusive, and human-centered digital future.

安德烈亞．塔皮亞教授簡介

塔皮亞（Andrea Tapia）教授擔任賓州州立大學資訊科學與技術學院院長，負責監督學院的各個方面，包括推動資訊技術教育和研究上的卓越與創新；實施吸引和培訓學生、教職員工的計劃；堅持對大學多樣性、公平、包容和歸屬感的承諾；以及管理學院的財務資源。她是危機資訊學的國際學者，研究主要探討信息技術與社會、文化、政治、經濟和組織結構之間的相互影響。

鍾布教授簡介

鍾布是香港浸會大學傳理學院互動媒體系的創系主任和教授，同時也擔任賓夕法尼亞州立大學唐納德．P．貝利薩里奧傳媒學院的教授，以及該校資訊科學與技術學院的兼職教授。他曾擔任國際中華傳播學會會長、美國新聞與大眾傳播教育學會（Association for Education in Journalism and Mass Communication, AEJMC）大眾傳播與社會分會主席，目前是《電腦與人類行為》（*Computers in Human Behavior*）期刊的高級編輯。鍾布教授的研究興趣涵蓋傳播、科技和人類行為的融合。他的研究應用決策理論和跨學科方法，分析個人與數字技術的互動，以及這些互動對行為、心理健康和整個社會的影響。

AT：安德烈亞．塔皮亞
BZ：鍾布
YS：宋韻雅
AU：觀眾

YS： 合作經常被認為是解決社會難題的關鍵。傳播學與資訊科學能夠如何更有效地協作？跨學科研究在當中又扮演甚麼角色？

AT： 資訊科學與技術學院是賓州州立大學中最跨領域的學院。我們創立的理念是跨領域不只是好，而是完全必要，才能回答複雜的社會與技術問題。社會與技術問題橫跨兩個專業領域，你需要來自

這兩方面的代表，很可能還需要更多，所以跨學科協作至關重要，亦是一切工作的基礎。我實在無法想像，當今任何問題，無論是人工智慧、錯誤資訊、詐騙、網絡安全、信任或倫理，能夠不依賴跨學科協作就得以解決。

BZ： 我想強調一下傳播學者在跨學科研究中的獨特貢獻和發揮的作用。跨學科的方法能為創新思想提供良好的交流平台。在跨領域、跨產業傳遞知識的過程中，我們需要對受眾有充分理解，並建立共同基礎，同時尊重各方面的多元性。另外，當今世界越來越複雜，我們需要提出更全面的解決方案來應對社會議題與挑戰。我認為傳播與資訊科學聯手，可以為當前的社會難題提供許多創新解決方案。

AT： 資訊科學與技術領域並非傳統學科，我們既不製造具體成果，也不發展理論，甚至沒有固定的研究方法，許多的理論和方法都來自傳播學與社會科學。我們向社會科學家借用研究方法，沒有他們就無法推動研究。

YS： 塔皮亞教授，您在危機資訊學方面的專長改變了這個領域，當中有哪些新興的趨勢？又該如何運用這些趨勢以提升災害應變與危機傳播？鍾教授，從您的角度來看，這些新趨勢要如何與傳播研究結合，特別是在危機時期幫助建立公眾信任？

AT： 傳播學徹底改變了危機資訊學。在 2010 年海地大地震中，超過 20 萬人死亡，這改變了整個應變方式。過去只有在受災者主動詢問時，才能從政府或救援單位獲取資訊。但在海地地震時，幾乎每個人手上都有手機，不僅能接收，也能發送資訊，這代表他們直接參與了救災。然而，當大家同時發聲，回應機構根本無法處理如此大量的資訊。

聯合國帶著人道主義的資訊網絡前往災區，但由於資訊量太龐大，無法有效運用。這時資訊科學介入了。我們說：「我們可以幫忙！我們能分析簡訊、社群媒體、貼文，快速處理、判斷真相並將其呈現在地圖上。這些我們都能迅速完成，讓你能做出更好的決策。」這就是危機資訊學的強項——速度、準確、定位與即時資訊傳遞。

BZ： 說得很好！我不是危機資訊學專家，剛才聽到的是專家的觀點。在這個過程中，我總覺得救援人員與受災社區之間還有改進空間。怎麼改善彼此溝通和了解需求？又如何提升資訊的速度與準確度？在傳播學領域，這方面的研究還有很大發展空間。當危機發生時，情緒容易激動與焦慮，這時應如何建立信任？如你所說，這正需要傳播研究進一步介入與探討。

AT： 傳播與危機資訊學學者正合作研究該如何讓人在危機時採取行動。例如，在颱風警告即將生效，群眾需要撤離時，難題就在於如何讓人真正採取行動。警告有時甚至會產生反效果，像多年前有學生為逃避考試而謊報炸彈威脅，學校通知大家遠離，但許多學生反而湊近拍照自拍。這證明面對恐懼時，必須極其謹慎地設計訊息，否則無法達到預期效果。

BZ： 這是一個很好的例子。我在賓州州立大學與氣象學者合作研究時，氣象學家也面臨類似的問題。雖然不一定是炸彈威脅，但每當暴風雪來臨，我們會呼籲民眾避免駕駛外出，而且如非必要就盡量不要在極端天氣下於高速公路駕駛，但人們總是不聽勸告。後來我們改口說：「遇到鹽塵暴時，你有15%的死亡率。」即便如此，民眾依然無動於衷。直到我們調整說法，如「去年已有數人因此而重傷」，訊息甚至不必提及死亡，卻反而更有效。

還有一點令人遺憾的觀察，人們對特定詞彙和報導的信任度往往存在認知偏誤。比如氣象預報提到氣溫時，通常會給出區間值，而非精確到70或72度。但民眾總抱怨說：「為甚麼不給我確切數字？這樣我很不安。」事實上，氣象學家根本無法斷言「今天的溫度絕對是70度」，科學上本來就有合理誤差範圍，例如70到74度，只是多數人不習慣這種表述方式。他們堅持要聽到精確的數字。

YS： 人工智慧與機器學習正在改變各個領域的研究。您如何看待這些技術對傳播學與資訊科學的影響，尤其是在資料分析與決策應用方面？

AT： AI正在徹底改變一切，就像當年手機普及徹底顛覆了災害應變一樣。例如我們學院有研究人員利用AI協助氣象學家分析雲層圖

像，提升氣象預報準確度；也有運用AI分析癌症病患的基因資料，為不同患者量身打造治療方案。

在傳播學與資訊科學領域，AI正在將責任從機構轉移到個人。現在，AI迫使我們質疑眼前所見的資訊是否真實原創。AI能為每個人提供更個人化的體驗，也讓我們能隨時獲取專屬資訊，但同時我們也必須學會判斷真偽。

BZ： 我從塔皮亞教授的分享中獲益良多。我認為人工智慧為我們，尤其是年輕一代，開啟了嶄新的大門。而其中最令人印象深刻的是，我們現在能有機會取得過去難以觸及的數據集。我常試圖比較量化與質化研究方法的差異，但量化研究可能需要20年沉澱，需要反覆研讀、思考整個脈絡，才能產出具有洞見的論文。但如今有了AI與機器學習工具，質化方法能幫助我們挖掘前所未有的新觀點。即使身為年輕學者，也可能發現資深研究者未曾注意的深刻見解。不過容我直言，這樣的機會之窗不會永遠敞開——資深學者們很快也會掌握這些工具。這正是年輕人迎頭趕上的絕佳時機，甚至能直接與該領域的頂尖學者對話。

以地方收入與健康研究為例，除了像埃里克．施密特（Eric Schmidt）這類極有經驗的專家，多數學者的經驗與教訓都無法預測AI將引領我們走向何方。我們此刻共同站在AI與機器學習的歷史分水嶺前，任何忽視趨勢的人都將被邊緣化——正如我們常說的：AI不會取代人類，但善用AI的人終將淘汰那些拒絕理解AI的人。

AT： 我想提醒大家思考AI對人類獨特性所帶來的挑戰，也迫使我們思考究竟人類有哪些能力是電腦無法做到的。

大概十年前，有人發現了《紐約時報》一百年前的報紙檔案，但紙本已嚴重損壞，無法用電腦辨識。後來人機驗證（CAPTCHA）被發明，人需辨識電腦看不懂的扭曲字型以證明自己是人類。但隨著AI進步，如今電腦也開始能辨認這些扭曲字母。我們需要思考：人類還有哪些能力是機器無法取代的？

作為傳播學學者，這是必須不斷思考的問題。當AI能做的事與人類一樣好，甚至更好時，是否代表我們應該讓機器來做？

這個界線會不斷變化，未來我們必須決定自己要成為知識的生產者還是消費者。

YS： 包容與平等是當今研究的重要議題。您認為在傳播與資訊科學領域，特別是資訊科學與科技的研究中，應採取哪些策略，以確保包容與平等，並能反映多元觀點與需求？

BZ： 這確實是一個關鍵術語。在西方研究領域，平等（equality）這個概念被廣泛運用，但在亞洲地區較少直接的討論。我們更常關注的是「AI素養」、「AI鴻溝」或「AI倫理」等方面。我認為必須正視弱勢群體的實際需求——當中國推出自動駕駛計程車（Robotaxi）時，許多計程車司機都擔心自己的工作會被取代。雖然我們可以輕鬆地說「不會的，新技術創造了新工作機會」，但對一些只會開計程車的司機來說，他們該如何適應這項新技術？

作為研究者，當新技術來臨時，我們其實很難給出簡單的解決方案。我們該如何避免重蹈「數字鴻溝」的覆轍，防止出現「AI鴻溝」？不同年齡層對電腦技術的反應有明顯差異。在我的研究團隊開發新應用程式時發現：老年人因為視力退化、手部顫抖，根本無法準確點擊應用程式按鈕，他們反而更習慣使用進度條設計。因此我們為老年族群調整了設計，結果證明進度條確實比點擊按鈕更適合他們。但如果不進行這類研究，年輕人永遠不會意識到這種差異。

在香港浸會大學，我們有一組研究人員正在探討字體大小如何影響弱視者的閱讀體驗——他們的閱讀方式與我們截然不同，可能會把「p」和「q」看成相同的字母。因此我們設計了一些看似奇怪、但對弱視者非常友善的特殊字體。在這類研究過程中，我們有許多專案需要傳播學與資訊科學專家共同合作，才能為老年族群、身障人士等弱勢群體找到最佳解決方案。

我們還在為自閉症兒童開發新型故事板。這些互動式媒體或許能幫助一些難以與老師、父母溝通的孩子，透過在幼年時期用互動媒體講述故事，幫助他們建立基本理解能力。雖然他們的理解程度可能永遠達不到一般兒童的水平，但至少能獲得專屬的傳播渠道。

AT： AI的包容與平等取決於輸入的數據。如果訓練資料帶有偏見或有限，就會強化這些偏見。例如，有些AI控制的感應燈無法感應深色皮膚，是因為訓練資料只來自淺色皮膚的人。這突顯出AI如果一開始就缺乏包容，其後可能導致嚴重問題。因此，開發AI系統時必須優先考慮數據多元性，例如AI只用年輕男性的數據作醫療用途，對其他族群就不準確。

還有「AI污染」的問題——當AI生成的內容反覆被加入訓練資料，可能會逐漸腐化數據的多樣性。為維持包容與公平，我們必須保持數據乾淨，確保AI反映人類多元的經驗與觀點。

YS： 隨著科技進步，倫理問題日益重要。您認為研究者應優先考慮哪些倫理原則，以確保傳播與資訊科學領域的創新是負責任的？

BZ： 這是我最熱衷的議題。我想就此談論三個重點：

首先，我要提出「負責任創新」（responsible innovation）這個概念。現今，創新需要具備社會責任感。這個理念適用於所有創新領域，尤其是當我們面臨如此多的技術進步時。

其次，我想討論科技進步的廣泛影響。我們需要更多研究來理解：這些進步如何影響社會？會產生怎麼樣的社會效應？不同類型的技術進步之間又如何相互影響？

許多問題我們仍在摸索中。例如，當今許多年輕人飽受憂鬱症困擾，但我們很少追溯造成現狀的根源。就像我提到的自殺研究顯示：人們在「成功」自殺前平均會嘗試87次。在這87次嘗試中，存在無數介入的機會——我們可以在關鍵時刻介入，改變結果。適時的介入能夠挽救生命，給最需要關愛的人帶來希望。

第三個關鍵詞是「數據壟斷」（data monopoly）。我越來越擔心那些掌握用戶大量數據的大型科技公司，像是騰訊、淘寶、谷歌等科技巨頭公司。這些公司能夠利用他們的數據準確預測你接下來想買甚麼，卻沒有告訴你實際情況。政府對於這些公司如何串聯和使用這類的數據，是完全沒有任何監管規範的。

舉例來說，亞馬遜只允許你在他們的平台上使用他們的數據。除非你能證明並獲得授權，否則根本無法與其他人共享這些數據，這點讓我十分憂心。我們開始意識到壟斷對商業發展和經

濟成長有害，而數據壟斷的問題正逼近我們。這主要涉及三個層面。所以我希望能談談AI倫理、負責任的創新、科技進步帶來的廣泛影響，以及數據壟斷的問題。

AT： 錯誤資訊是重大倫理議題。最近美國總統大選，許多年輕選民不是從傳統媒體獲取資訊，而是社交媒體（如X、Instagram、TikTok）。這突顯了一個現象：當我們依賴的資訊經過千萬人與非傳統媒體來源的過濾，很容易造成誤導。

資訊科學家有責任開發工具來偵測與打擊錯誤資訊，也必須教育大家如何判斷網絡訊息的真偽。比如許多人用「三點驗證法」: 只要在多處看到同一消息就認為是真的，但這種方法很容易被假資訊濫用。我們的責任就是確保網絡作為公共資源是安全、真實且賦能的。給予大家辨別真偽的能力，這是傳播與資訊科學研究者與教育者的責任。

YS： 塔皮亞教授，您在社會與組織資訊學方面的研究對技術與組織互動有深刻見解。這些研究如何改善科技與組織結構的互動？鍾教授，傳播學研究又如何有助於理解這些動態？

AT： 社會與組織資訊學關注技術如何融入組織結構，讓兩者共同演化。科技並不中立，而是帶有特定意圖與價值觀。當我們將科技引入人類組織時，總會出現意料之外的應用方式。例如我們有研究人員研究「零工經濟」——那些臨時、任務導向的服務業工作。這些技術不僅改變勞動者的生活，也影響交通、商業、餐飲，甚至社區流動。社會資訊學者的工作就是觀察技術如何擴散並影響各層面，並反過來改變技術本身。

BZ： 我想延續關於「複雜性」與「人文面向」的討論。我們常說一切都要「以人為本」，但現在我們開始意識到，其實不必再刻意強調這點——因為我們早已默認所有事物都應以人為核心。然而，這反而讓我們忽略了「組織結構」這個關鍵要素，而這正是科技與組織互動的重要環節。

在這些社會動態中，我們需要更深入檢視「組織情境」與「文化背景」。必須制定策略來優化科技在組織內的採納與整合流程。在香港浸會大學，我們有一群深耕組織傳播學的優秀學者，

同時也聚焦公共關係、廣告等領域，探討企業的社會責任行為。我們需要以此方式來教育機構，才能更深入理解科技如何與組織機構互動。

值得注意的是，組織機構往往會引導或放大我們對特定知識類型的關注。在這個領域，我認為資訊科學家是有些落後的——我們應該更聚焦於組織結構及其影響力。

YS：教育是培養下一代的關鍵。面對傳播與資訊科學的迅猛變化，您認為有哪些創新教學模式能更有效地賦能學生？

BZ：當我思考21世紀學生最亟需具備的能力時，我認為處理資訊的能力，以及從高質量、決策資訊中分辨錯誤資訊的能力是至關重要的。我們生活在一個資訊爆炸的時代，現代人一年內接觸的資訊量相當於19世紀人一生所見。作為老師、社會科學家、教授，我們要教導年輕人在生活中理解資訊的重要性。因此我們不斷改革課程，與時俱進。我也很重視讓學生有實驗性學習機會，因為學習永無止境，無論碩士還是博士，學習都是一生的事業。

從教育的角度來看，我從我的院長瑪麗．哈丁（Marie Hardin）身上學到很多，特別是對學生成長的真誠關懷。在疫情期間，我與學生談過如何保持心理韌性。我以為自己只是在分享一些常見做法和研究技巧，但學生告訴我，他們真正喜歡賓州州立大學的原因是教授們真心關注他們的心理健康。學生能感受到老師是否真的為他們著想，這一切都在於建立牢固的人際關係。我們有教職員轉到其他大學，所有學生都會跟隨。當教授真正關心學生時，學生是能夠察覺到的。這不僅僅是關於成績或評價，而是關乎學生感受到自己被悉心照顧的感覺。過去20年來，我們詢問賓州州立大學的畢業生對於在校期間的滿意度時，他們始終表達出極高的滿意和喜愛。相較之下，當我在另外一所美國大學任教時，儘管該校仍是一所優秀的學府，但仍聽說有30%到40%的學生後悔入讀。我從未聽過賓州州立大學的畢業生有這樣的遺憾，我也希望香港的學生能夠擁有同樣正面的學習體驗。

AT：傳統的教育觀念——學生離家四年讀大學、獲得一紙學歷——已經不合時宜。現今學生知道，畢業後學習並不會結束。以前的

人可能一輩子只做一份工作，如今的勞動力市場不斷演變，個人可能會多次轉換工作，每次職業轉變都需要獲取新的技能和學習。

我畢業時以為教育結束了。但對現在的學生、我的孩子來說，學習是終身的。隨著職業的變化，他們會持續取得新技能、認證與資格。教育成為長期的歷程。

對資訊科學這類領域來說，教學模式需要具備高度彈性與個別化特質。課程不應再「一體適用」，而應依照學生的知識背景與學習節奏量身打造。無論是在教室裏、工作中，還是在日常活動如烹飪或通勤時，我們都在持續學習。隨著教育變得更加整合，大學必須改變其方法，使課程更加靈活、混合並量身定製，以滿足不斷變化的學生群體需求。我在孩子的教育中看到了這種轉變，並預期它將繼續在未來的世代中演變。

YS： 國際合作對推動研究非常重要。如何促進傳播學與資訊科學的全球合作？此類合作有哪些關鍵益處與潛在挑戰？

BZ： 我很樂意分享這方面的經驗。回顧我的學術歷程：我先在中國完成本科，其後赴美攻讀碩士、博士學位，並留美任教多年。這讓我深刻體會到國際合作的重要性。

推動有效的全球合作，首先需要培養全球化思維，也就是願意與來自不同背景、學科、文化的人士合作。這並不容易，尤其隨著年齡增長與專業定型，我們開始形成強烈的信念，並對自己的方法充滿信心。因此我推廣「可塑性思維」——保持彈性與耐心，即使觀點相左，也要有耐心傾聽，學習彼此。

作為教育工作者，我們常說要培養「閱讀型大腦」，但要達到這一點，我們需要從一個具有可塑性的思維開始。這種開放性很重要，因為錯誤資訊最容易迎合我們既有的信念與經驗。例如我剛到美國時，中國學生很少，多數亞洲學生是日本人。現在情況變了，但我注意到許多中國學生仍然非常依賴微信群組，可以看出他們尚未完全融入，連結感仍然停留在自己的世界中。當我在紐約市時，我會和計程車司機聊天，詢問他們在聽甚麼音樂。如果我碰巧在唐人街，發現只聽中文流行歌曲的出租車司機通常英語不太好，來美國多年也很難提高英語水平。

這種現象中美皆然。你可以觀察大家在手機上用甚麼語言系統——是中文、英文，還是其他的語言系統？我經常鼓勵學生在美國學習的幾年都嘗試設置成英語系統。這是一個小小的步驟，但可以幫助他們培養全球化思維。這有點像卡爾．馬克思（Karl Marx）的旅程——他是一位德國哲學家，但他最重要的工作是在英國完成的。為甚麼不擁抱成為全球公民的想法呢？

我非常幸運，你們也是。幸好父母教我兩種語言，我才能在雙語環境中長大。看看你們所有人——你們也至少會說兩種語言。你知道這對你的大腦有甚麼影響嗎？雙語環境讓大腦更具可塑性，這有助於你更快、更好地學習。

AT： 多元來自差異，沒有差異就無法進步。我們的學院在賓州州立大學中具有一定的獨特性。我們較少安排學生和教職員到國外，並非出於不願，只是機會不多；但我們是賓州州立大學中最國際化的學院，大約80%的教職員是國際人士，95%的碩士生是國際學生。在我之前提到的175名博士生中，大約130至135名來自中國大陸。這種多元的國際組合對我們至關重要，我們在建立大型語言模型與系統時，就需要來自不同背景、語言的人帶來新想法。

YS： 尋找研究經費與資源通常充滿挑戰，過程中會遇上哪些主要障礙？機構與研究者又該如何突破瓶頸，持續推動創新發展？

AT： 簡而言之，研究資金通常有兩個來源：政府和行業，這兩者都會受政策變動與市場優先順序影響。例如，目前網絡與安全相關的研究人員通常有穩定的資金支持，但其他領域可能面臨更多挑戰。這完全取決於當下所關注的重點。

BZ： 我很想分享一點：做研究時要考慮社會影響，不只是個人興趣。你的熱情很重要——這是讓你保持精力充沛和專注於項目的原因。但同時，也要考慮市場和社會需求。例如，香港面臨人口老化問題，如果你的研究能夠改善長者照護，或者解決身障人士面臨的問題，其社會影響可能會有機會帶來資金。

當我們建立AI媒體中心時，大學副校長鼓勵我們打造一個平台來展示我們的研究成果。例如，我們最近開展了一個手語項

目，利用AI識別香港的四種手語。這些不同群體的人之前無法相互交流。在香港，有超過25萬人有聽力障礙，而在中國大陸則有超過3,000萬人。AI可以幫助縮小這些溝通差距，改善獲取資訊和互動的方式。那麼，我們如何獲得這類項目的資金呢？我不確定，但我們會繼續努力，我堅信我們的研究將惠及有需要的人。如果這次沒有獲得資金支持，我們會繼續嘗試，就像你在學術期刊上提交論文，即使被拒絕也會繼續努力，我們不會放棄。

YS： 面對當前趨勢與挑戰，您認為傳播學與資訊科學最有前景的未來研究領域是甚麼？研究人員應如何定位自己以在這些新興領域中領先？

AT： 現在的關鍵挑戰是，如何給AI生成內容加上浮水印，以確保能追隨到原始來源。這涉及政策、技術與社會層面的重大問題，我很希望有研究者能專注於此。如果我有機會聘請任何研究者，這將會是我最優先支持的研究方向。

BZ： 對我來說，我仍然對新興技術對行為改變的影響感到神奇。這會出現怎麼樣的新行為呢？我之前和學生分享過這個話題。我曾問過我七十多歲的父母，當他們年輕時，哪種新技術對他們的生活影響最大。我爸爸是一位中國文學教授，媽媽也是教授。我原以為他們會給我一個學術性的答案，但他們說：「電力」。

電力是革命性的。在今天，我們視其為理所當然，就像水或空氣一樣不可或缺。同樣，無線網絡也是我們現在所習以為常的東西。當走進任何的建築物，你期望能有無線網絡或數據覆蓋。如果沒有，你會感到不舒服。這引發了一個問題：今天AI正在改變怎麼樣的人類行為？想像一千年後，人們回顧這一代時，他們會怎麼說AI在如此短的時間內改變了我們？

這讓我很感興趣——科技接受與行為變遷的機制。另一個我關注的是「數字未來」：我們究竟在打造怎麼樣的數字未來？更重要的是，每個人對未來的想像都會因背景與經歷而異。這就是我專注於研究AI如何與人類的想像力相連的原因。對人類來說，想像力是一種奢侈，只有在滿足基本需求後，我們才能擁有

這種能力。AI如何影響我們的想像力，特別是在與數字未來相關的方面？這些是我覺得特別令人興奮的領域。

YS： 感謝兩位教授的精闢見解。現在有請在場觀眾參與討論。

AU： 在星期一的會談中，塔皮亞教授您提到了災難應對，今天又再次提到。您說了一句非常有趣的話：「我們可以找到真相。」如果以語言分析的角度，您似乎對自己設計的災難應對計劃很自豪。若我們現在討論的是戰爭，像中東和烏克蘭這樣在過去20年，甚至50年裏戰爭不斷的地方，您是否參與過或聽說過任何使用數據來實時尋找真相的計劃？我特別想到現在在以色列和巴勒斯坦發生的事情，這是一個不僅影響美國，而是影響全世界的巨大話題。您是否有任何計劃以您方式去尋找真相，或幫助人們獲取共享資訊？

AT： 你提出的問題確實很棘手——這涉及到「複雜災難」，即戰爭、自然災害和政治影響等因素相互交織和互動。在這種情況下，每個受影響的群體都有自己版本的真相，要尋找真相是很困難的。你要找到的是誰的真相呢？根據我在聯合國和其他組織的工作，我了解到，與其專注於「真相」，更可行的方法可能是促使交戰各方就「尋找安全」達成共識，並提供經過驗證的資訊，告知人們在哪裏可以獲得食物、水、住所和藥品。但即使是這樣，在衝突地區也可能很難實現。

AU： 感謝您，教授。這非常激勵人心。我有一個關於您之前提到的複雜性的問題。我對危機和緊急通信非常著迷，這學期我提出了一個想法，考慮到所有利益相關者——政府、公眾、通信渠道、資訊的輸入和輸出等等。但我的教授說我考慮得太多了：我們都知道這樣的情況很複雜，受到許多因素的影響，但研究中我們可能需要分離最重要的變量或識別它們之間最關鍵的關係，否則可能會失去重點。那麼，從一般意義上講，我們如何識別複雜研究主題或現象中的主要變量呢？

AT： 我的建議是專注於部分可管理的問題——不要試圖一次解決所有問題，你可以把這看作是一個終身挑戰。如果你剛開始，那還

有很多年時間來處理更大、更複雜的問題。現在可以選擇一個具體且可行的問題面向，以便進行數據收集。可能你會很想瞄準最吸引人的問題，但這類的平衡需要在你的職業生涯中逐步解決。

AU：我有一個關於技術和組織動態的後續問題。當我聽到這些問題時，我想到了創新擴散理論。埃弗里特·羅傑斯（Everett Rogers）曾是我的論文導師，他提出了一個觀點：當新技術出現時，組織中會有創新者、早期採用者、早期大眾、晚期大眾和落後者。我專研組織傳播，並在去年夏天，哈丁教授問我，組織傳播學者可以就員工溝通提供甚麼建議。具體來說，我們可以如何有效地傳達變革訊息？如何鼓勵員工在組織中採用新技術？我在商學院修課，比如管理資訊系統，我注意到那裏的人對這些問題的處理方式非常不同。作為傳播學者，我們會說需要改善與員工的溝通——例如領導交換、管理風格和創新擴散。在商學院，他們卻通常認為問題不在於人，而在於技術本身。他們更傾向於使用類似技術接受模型的方法，認為問題出在技術上，應該對其進行修改以便更容易被接受。對我們來說，重點是說服人們接受技術。您對此有甚麼評論？

AT：答案並不簡單，因為這不僅僅是單方面的問題。如果你是一名社會技術學者，你會認識到技術和人員都在實現管理者目標中發揮作用。挑戰在於如何讓兩者協同工作。一些人認為技術需要適應組織，而另一些人則認為組織應該適應技術。這兩種觀點都不完全正確。關鍵在於創建一套機制，讓你能夠評估待達成的目標，並同時調整技術和組織結構。這運作的方式很困難。不過這場辯論將會很有趣！

AU：非常感謝您帶來這場有趣的對話。我想重溫一下開頭的內容，特別是您提到的資訊科學和傳播學之間的密切關係。我對您在資訊科學和傳播學之間相互關係的看法非常感興趣，尤其是在理論構建和方法論範式方面。您認為在這個跨學科領域中可能出現哪些具體研究重點和問題？此外，我很想聽聽您對現在的博士生的見解和建議，我們希望在資訊科學和傳播學之間進行跨學科合作，尤其是在人工智能的發展方面。非常感謝！

AT： 我不是傳播學者，所以其他人可能會提供更全面的回答。不過，我可以從資訊科學的角度來提供一些看法。對我們而言，重點不在於改善公共溝通，而是在於理解人們在說甚麼、為甚麼這樣說，以及政府等系統式的回應可能失效的原因。例如，分析關於颶風桑迪的兩萬多條推文可以幫助我們理解對話內容，但不一定能改善溝通方式。這時傳播學者可以介入，提出「我們如何改善與公眾溝通的方式以防止傷害？」的問題。這就是資訊科學和傳播學交匯的地方。

BZ： 我也鼓勵傳播學者將自己視為合作中的平等夥伴。一開始，我們可能會想：「我如何能幫助資訊科學家進行研究？」但重要的是要將自己視為平等的夥伴，因為我們也有獨特的貢獻。如果不以平等的方式進行合作，這種夥伴關係就不會持久。我們可能只能在一兩次中提供有限的幫助，但如果不能對彼此的工作做出重大貢獻，合作的效果就會降低。我們最終需要找到共同的立足點。

早前我提到研究的其中一個關鍵要素是找到共同的立足點。我非常喜歡美國的比喻，過去來自不同背景的人被稱為「熔爐」（melting pot）。如今，我們認為這不是最佳的比喻，反而更喜歡「沙拉碗」（salad bowl）這個詞。在沙拉碗中，每種食材——無論是番茄、黃瓜還是蘿蔔——都保持著獨特性，但結合在一起時，它們創造出更生動有趣的事物。每一部分都保留其個性，但共同組成了一個更具吸引力的整體。

AT： 讓我再補充一個想法，這是來自我對「溝通的無知」的視角。想像一個沒有正式新聞的世界——沒有廣播、電視或報紙。在這種情況下，我們如何創建一個系統，讓人們仍然能夠獲得關於世界、社區和周圍事件的可靠資訊？從資訊科學的角度來看，我們會專注於建立傳遞這些資訊的基礎設施。然而，內容本身則超出了我們的專業範疇。因此，真正的問題在於：在沒有正式新聞系統的情況下，我們如何創建一種機制來分發新聞並確保其可靠性？這領域需要專業的傳播知識，以確保資訊保持準確和有效。

AU： 您提到您對颶風桑迪和其他危機的研究。我認為這些危機是區域性的，比如只影響到美國或中國大陸的部分地區。但在過去十年

中，我們經歷了許多全球性危機，比如新冠疫情、全球政治極化和全球的氣候緊急情況。您認為這些全球性危機是否改變了跨學科研究中的優先次序和資訊？如果是的話，具體又是怎樣的改變？

AT： 是的，絕對如此。新冠疫情是本世紀的決定性事件——它幾乎重塑了我們生活的每方面，例如如何互動、旅行、工作和學習。這次事件的影響廣泛，幾乎不可能進行全面研究。我們只可以專注於較小的部分，比如谷歌對感冒藥或咳嗽的搜索如何與流感或新冠疫情的高峰相關聯，但更大的挑戰是如何有效地研究這樣的大規模危機。

這引出了「代理資訊」的概念——通過觀察相關數據來理解現象。例如，AI可以比人類更高效地識別這些代理。AI不僅僅關注像咳嗽或紙巾盒這樣明顯的信號，還可以分析大量數據，比如X的帖子，可能會發現出一種我們從未想像到的尋找模式或信號。新冠疫情危機促使我們重新思考如何使用代理資訊，並為我們提供了研究全球現象的新工具和方法。

BZ： 我想快速補充一點，這次疫情和其他全球災難一樣，確實讓我們學到了一些關於全球化的事情。一方面，它展示了全球化如何運作，但另一方面，也揭示了全球化的不足。這其中有很多受影響的因素。當我研究從中國開始的疫情反應以及後來在美國的反應時，我們看到很多差異。面對同樣的災難，但行動卻如此不同。

在關於疫情期間同理心的研究中，我們考察了人們的同理心是如何改變。我們研究了社會地位和身分如何影響同理心。之前我們談到「深層工作者」，對吧？我們研究了一些工作者，例如在中國經營小餐館的業者，嚴重受到疫情影響的原因。他們當中有些人剛剛借錢來翻新餐館，但卻無法接待客戶。

這顯示了各國之間的巨大的差異，與我們過去的想法不同。我們討論了誰最需要新聞——有些人不主動尋求資訊，而是依賴朋友或在社交媒體上獲取新聞，相信資訊會自動傳遞給他們。其他人則直接向專家或主流新聞尋求資訊。

這次疫情迫使我們重新思考一些以往視為理所當然的事情，比如認為互聯網將提供一個促進理解的公共領域，以及對新聞與

言論自由的日後發展。事實是，情況變得比以前更加分裂。在美國，人們對其他意識形態越來越不寬容。許多人說：「我不會與持有其他政黨觀點的人合作。」

疫情讓我們意識到世界的複雜性。這不只是將全球化應用於一切，也不是將一切簡化為單一視角。疫情給了我們機會重新審視自己的研究，重新思考我們如何看待彼此和世界，以及重新評估我們在未來十年中的發展前景。

Academic Dialogue with **Andrea TAPIA** and **Bu ZHONG**

Interrogating the Social Life of AI: The Power of Interdisciplinary Dialogue

AT: Andrea TAPIA
BZ: Bu ZHONG
YS: Yunya Celine SONG
AU: Audience

YS: Collaboration is often cited as essential for addressing societal challenges. How can communication and information sciences (CIS) work together more effectively, and what role does interdisciplinary research play in this?

AT: The College of Information Sciences and Technology is the most interdisciplinary college at Penn State. We have built our college on the idea that interdisciplinarity is not just good, but completely necessary to answer complicated socio-technical questions. Socio-technical problems involve both social and technical aspects, so both sides need representation. You probably need even more than that. Interdisciplinary collaboration is essential and the foundation of everything we do. I cannot imagine a modern problem, including artificial intelligence (AI), misinformation, deception, and cybersecurity, that does not require interdisciplinarity and collaboration.

BZ: I just want to follow up and mention a couple of the contributions from communication scholars. Interdisciplinary approaches provide a wonderful platform for cross-fertilization of innovative ideas. During the process, we transfer knowledge across disciplines and sectors and need to have a good understanding of the audience while establishing common ground. We also need to respect diversity in those three areas. Communication can provide a role. Another reason we do introduce better research is because we are facing a more complex world than before. And that requires us to provide more comprehensive solutions

to social issues and social challenges. I think communication and information science work together to address many social challenges and offer innovative solutions.

AT: Our field of information sciences and technology is not a traditional one. We do not build things or develop theories and have no methods. Many of our theories and methods come from communication and the social sciences. We come to social scientists to borrow these methods to do our research. Without them, we cannot conduct our research.

YS: Prof. Tapia, your expertise in crisis informatics has transformed the field. What are some emerging trends, and how can they be leveraged to improve disaster response and crisis communication? Prof. Zhong, from your perspective, how do these trends intersect with communication research, particularly in building public trust during crises?

AT: Communications has changed everything in crisis informatics. Take the 2010 earthquake in Haiti that killed more than 200,000 people. It changed everything about how we respond to disasters. In previous disasters, those who were impacted received information from the government and providers, usually only when they asked for it. In the Haitian earthquake, nearly everyone has a phone in their hand to both receive and provide information. This meant they all participated directly in their response. But they were all speaking at the same time, and the responding organizations were not prepared for that amount of information.

The United Nations (UN) showed up with our humanitarian information network, but there was so much information. The information was useless unless it could be processed and understood. That is when information science stepped in. We said, "We can help. We can listen to their texts; we can gather their social media; we can gather what they are posting. We can process it, find the truth, and put it on a map. We can do it fast so you can make better decisions." That is what crisis informatics is good at—speedy accuracy, location, and delivery of necessary information in real time.

BZ: Yes. That is why I am not an expert in crisis informatics or what you heard from a real expert sounds like. During the process, I always feel there is some room for improvement between responders and affected communities. How are we going to improve their communication? Got a better understanding of their needs and also enhanced the speed

and accuracy of information needed by both responders and affected populations in that way. In that area of communication, people do not do much research about it. That could be a new research area identified by Prof. Tapia today. How can we enhance trust during a crisis? How do you ask individuals to cool down? They are not going to cool down; a person gets too angry, like an anxious person, and this situation could kill. In your words, a little bit more communication research is needed to build the trust.

AT: Communication and crisis informatics scholars are already collaborating to figure out how to get people to take action during crises. For example, if a typhoon caution is launched and evacuation is needed, the challenge is convincing people to act. It is difficult, and sometimes it creates the opposite effect. For example, several years ago a student called in a fake bomb threat to avoid an exam, and the university sent out a message telling everyone to stay away from the area. But instead of taking action, many students pulled out their phones to take selfies with the supposed bomb. This shows how communication strategies need to be carefully designed, especially when fear is involved, to ensure people actually act on the message.

BZ: That sounded like a very good example. While I was working at Penn State, meteorologists got the same issues as well. Not necessarily bomb threats, but whenever we have a snowstorm, we ask people to avoid driving during snowstorms: "You do not need to get on the highway unless there is something urgent," but people never listen. We ended up saying, "You have a 15% chance of getting killed if there is a salt storm," but people still would not listen. But when we framed it differently, saying, "In the last year, several people got seriously injured," and did not mention the possibility of death, that message seemed to work better.

Also, I think it is sad to see a lot about why people trust certain words and some articles. There is one more thing I want to add: whenever meteorologists give you today's temperature, it is usually a range, not exactly 70 degrees or 72 degrees, but people say, "You do not give me an exact number. I will feel uncomfortable." Meteorologists cannot say that it is exactly 70 degrees. That could range from 70 to 74 degrees. But people do not get used to that, "You need to specify an exact temperature."

YS: AI and machine learning are reshaping research across fields. How do you see these technologies transforming CIS, particularly in data analysis and decision-making?

AT: AI is revolutionizing everything, much like how the widespread use of cell phones during disasters changed crisis response. It is a disruptive technology that touches every industry. For example, we have researchers in our college exploring how AI can help meteorologists better predict weather by analyzing cloud patterns, making forecasts more accurate than ever. We also have researchers using AI to personalize cancer treatments by comparing a patient's genetic data with millions of others to create treatment plans specific to that person.

In CIS, AI is shifting responsibility from institutions to individuals. Previously, institutions ensured the accuracy of information, but now AI forces us to question whether what we are seeing is true or original. It also allows for personalized experiences and is helping us quickly access information tailored to our needs, but we are also now responsible for determining truth and accuracy.

BZ: I learned so much from Prof. Tapia's talks. I think AI opens new doors for us, especially for young people. I like that you took the opportunity to really get the inaccessible data set we previously did not have. I try to compare quantitative and qualitative approaches. Quantitative approaches need 20 years and a good reading, good luck, and thinking about the series before you can write some insightful articles there. Today, when you have the tools of AI and machine learning, they really help you gather new insights inaccessible to us. Even if you are a young scholar, you could have some profound findings. We did not notice this particular insight during our analysis. But this window will not be that large: some experienced scholars will eventually pick it up as well. This is a wonderful opportunity for young people to catch up, and you can have a direct dialogue with leading scholars in this area.

Take local income and health research as an example, except experienced experts like Eric Schmidt, most of our experiences and lessons we learned cannot predict where AI will lead us. We all face a neutral in front of us, which is AI and machine learning. And anyone who does not like to see the trends will be marginalized. That is what we always say—AI will not replace us; instead, those people who

understand AI and make good use of it will replace those people who do not.

AT: I would add a cautionary note about AI and its impact on what makes us uniquely human. AI forces us to think about what humans can do that computers cannot.

About 10 years ago, 100 years of the *New York Times* newspaper archives were discovered, but the papers had deteriorated. When they tried to digitize them, the smudged text could not be read by computers. To solve this, they used the CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart), where distorted words are presented to users to prove they are human. This was based on the idea that humans can read the smudged and twisted letters, but computers could not. However, as AI improves, computers are starting to understand these distorted characters. This raises the question: what are humans still better at than machines?

As communication scholars, you need to think about this. What is the threshold where AI can do something as well as, or better than, humans? If computers are better at a task, does that mean humans should cede control of it? This will keep evolving, and it is up to you to decide where your role is in this AI-driven world: will you be a producer or consumer of knowledge?

YS: Inclusivity and equity are crucial in research today. What strategies do you think can ensure that research in CIS research in information sciences and technology is inclusive and equitable, reflecting diverse perspectives and needs?

BZ: "Equity" is a term scholars and researchers use a lot in the research area. But in Asia, we do not mention too much about that. We will turn to see AI literacy, AI divide, or AI ethics in what we do. I think we need to address the needs of marginalized people. Whenever we have some new technologies here in China, the taxi drivers are scared about what the Robotaxi started in Wuhan. They thought that "my job had taken over." It is easy for us to say no, and we have created some new jobs there. But for those taxi drivers, the only skill they have is to drive a taxi. How are they going to deal with this new technology? For researchers, I do not think that we have a very easy answer to this when the new technology eventually comes to us and how we avoid the previous digital divide or AI divide today. Or sometimes, we

will have different age groups that respond to computer technology differently. In my research group, we were doing the new app. We find that the elderly cannot click on the app due to poor eyesight and shaky hands; instead, they prefer using the bar. Thus, we switch to doing this for the elderly group. We turn out to say bars work better than just a click. But for young people, if we do not pay attention to this point, we will not know what to be.

At Hong Kong Baptist University (HKBU), we have a group of researchers. We are also working to figure out how font size will affect individuals with low sight and how they can read on apps. Their reading is different from ours. They could say "p" and "q" are the same thing. So the researchers could design something weird-looking that only makes sense for people with poor eyesight. During this kind of process, we have a long line of projects that need communication and information scientists to figure out what is the best way to address the needs of our marginalized groups. They could be aged or have certain disabilities.

Another thing we are doing is trying to develop a new storyboard for those kids with autism. They cannot communicate well with teachers and even with their parents, but how about interactive media? It could help tell those kids some story to make sure they begin to understand a lot of things, even though they may not understand them as well as other kids do.

AT: AI's quality depends on the data we feed it, and this directly impacts inclusivity and equity in research. If AI is trained on biased or limited data, it can reinforce those biases. For example, AI-controlled lights did not work for people with darker skin because the system was trained on data only from individuals with lighter skin. This case highlights how AI can fail if it is not inclusive from the start.

When it comes to CIS, ensuring inclusivity means using diverse, representative data. If we are creating AI for healthcare, for instance, and only train it on data from one group, like young men, we risk creating inaccurate results for other demographics. As we develop AI systems, we need to prioritize diversity in the data we use.

There is also the risk of "slop" in AI—when AI-generated content gets reintroduced into the training data, gradually corrupting the

diversity and usefulness of the dataset. To maintain inclusivity and equity, we must keep our data clean and ensure it reflects the wide range of human experiences and perspectives.

YS: As technology evolves, ethical considerations are becoming increasingly important. What ethical principles do you think researchers should prioritize to ensure responsible innovation in CIS?

BZ: This is my favorite topic. I want to talk about three points about this one here.

The first term I like to use is "responsible innovation." Nowadays, innovation needs to carry a sense of social responsibility. This idea comes from a real college with a wonderful author page or center, where the emphasis on social responsibility is particularly highlighted. And this concept applies to all innovations, especially when we are facing so many advancements.

The second term I like to use refers to the broader implications of technological advancements. We need more research to understand how these advancements impact society, what their social implications turn out to be, and how one type of technological progress interacts with or influences another.

A lot of us are just trying to figure it out. For example, many young people struggle with depression today, but we do not often look back to understand what factors have contributed to the situation we are facing now. When we research suicides, we find that, on average, people attempt suicide 87 times before they "succeed." Within those 87 attempts, there are so many opportunities for intervention—so many moments where we can step in and make a difference. The intervention could save lives, change outcomes, and bring hope where it is most needed.

The third thing I want to mention is "data monopoly." I am increasingly worried about big technology companies that have so much of our data, like Tencent, Taobao, Google, and all those big tech companies. They can make all this be used and predict exactly what you like to buy next. And they did not tell you what is going on. There is no regulation from the government regarding how it is going to connect data from you and how to use this kind of data.

For example, Amazon can only allow you to use their data. So never share the data with anyone else until you have proven you got to use it. That is something that worried me. And we began to say that the monopoly is not good for business and growth. And the data monopoly is coming down to us. That is like three things. And I want you to mention AI ethics, responsible innovation, the broader implication of all technological advancement, and the data monopoly.

AT: Misinformation is a major ethical concern. In the recent United States (U.S.) presidential election, many people, particularly younger voters, got election information not from traditional news but from social media platforms like X, Instagram, and TikTok. This highlights a major issue: the truthfulness of the information we rely on is often filtered through millions of people and non-traditional sources, which can easily mislead us.

As information scientists, we have a responsibility to build tools that detect and combat this misinformation. But it is also essential to educate individuals on how to assess the truth of what they see online. For example, many people rely on triangulation—if they see the same news in multiple places, they believe it is true. However, this can be easily manipulated, as misinformation can be replicated across multiple platforms to create a false sense of credibility.

It is our job to ensure that the internet, as a public good, is safe, truthful, and empowering. We need to give people the tools to discern truth from falsehood in the digital age, and this must be part of our responsibility as educators and researchers in CIS.

YS: Prof. Tapia, your work in social and organizational informatics offers fascinating insights into how technology interacts with organizations. How can this research improve the interaction between technology and organizational structures? Prof. Zhong, how does communication research contribute to understanding these dynamics?

AT: Social and organizational informatics focuses on how technology integrates into organizational structures, where both the technology and the organization evolve together. Technologies are not neutral; they are created with specific intentions and values. When we introduce these tools into human contexts, they may be used in unexpected ways.

For example, one of our researchers is studying gig workers—those who work temporary, often task-oriented jobs in the service sector. These technologies change not just the workers' lives but also impact traffic, businesses, restaurants, and even how people move around their communities. Enabled by simple technologies, gig work ripples through many aspects of society, affecting organizations, industries, and daily life. As social informatics scholars, our job is to observe how these technological changes spread and alter everything they touch, which, in turn, reshapes the technology itself.

BZ: I would like to follow up on the idea of complication and the focus on the human aspect. We often say everything is "human-centered," but now we are starting to realize we no longer need to constantly emphasize that. We have automatically assumed everything should be human-centered, but it turns out that we have been ignoring organizational structures, which are a critical part of how technology interacts with organizations. In these social dynamics, both the organizational context and the cultural setting need to be examined more closely. We need to develop strategies to optimize technology adoption and integration within organizations. At HKBU, we actually have a strong community of scholars focused on organizational communication. We also focus on areas like public relations and advertising, discussing socially responsible corporate behaviors. We need to educate organizations in this way to enhance our understanding of how technology interacts with organizational structures. Organizational structures can often direct or amplify our attention to certain types of knowledge. In this area, I think we, as information scientists, are a bit behind. We should be focusing more on organizational structures and their impact.

YS: Education is critical to preparing the next generation. What innovative educational approaches can be adopted to equip students for the rapidly changing fields of CIS?

BZ: When I think about the most important skills for students in the 21st century, I believe the ability to process information and distinguish misinformation from high-quality, decision-making information is crucial. We live in an era of information overload. The amount of information people are exposed to within one year now would be equivalent to what someone in the 19th century might experience over an entire lifetime. As instructors, social scientists, and professors,

we need to teach young people to understand the importance of information in their lives. As part of that, we are constantly reforming our curriculum to keep pace with this changing landscape. I also emphasize experimental learning opportunities with my students because learning never stops. Whether you hold a master's degree or a Ph.D., learning is a lifelong endeavor.

From an educational perspective, I have learned a lot from my dean, Prof. Marie Hardin, about what truly matters—genuine care for your students' growth. During the pandemic, I spoke with my students about how to maintain mental resilience. I thought I was just sharing common practices and research tips, but the students told me that what they really loved about Penn State was how much their professors genuinely cared about their mental health. They could easily tell when a teacher was truly invested in their well-being. It is all about building strong interpersonal relationships. We have faculty members who leave for other universities, and many students follow them. When a professor genuinely cares, students will recognize it. It is not just about grades or evaluations; it is about how students feel about being in good hands. For nearly 20 years, when we ask Penn State graduates how much they enjoyed their time here, they consistently say they loved it. On the other hand, while teaching at another university, I heard that 30% to 40% of students regretted coming there, even though it is still a great school. I have never heard those words from Penn State graduates, and I hope that this is also the case for students in Hong Kong.

AT: The traditional view of education—where students leave home, attend a campus, and receive a set education over four years—is outdated. Today's students know that learning does not stop after graduation. Unlike previous generations who often stayed in one job for decades, today's workforce is constantly evolving, with individuals likely changing jobs multiple times. With each career shift, new skills and learning are required.

When I graduated, I thought education was a finished process. But for today's students—and for my children—learning is lifelong. They will continue to acquire new skills, certifications, and credentials as their careers evolve. Education has become an ongoing endeavor.

For fields like information science, this means our teaching methods need to be more adaptive and personalized. Instead of one-

size-fits-all lessons, education should be customized to each student's knowledge level and progress. Learning will happen continuously—whether in the classroom, at work, or during daily activities like cooking or commuting. As education becomes more integrated, universities must shift their approach, making courses more flexible, hybrid, and tailored to the needs of a changing student population. I see this shift in my children's education and anticipate it will continue to evolve for future generations.

YS: International collaboration is vital for advancing research. How can global partnerships in CIS be fostered, and what are the key benefits and challenges of such collaborations?

BZ: I would be happy to talk a bit about this. Reflecting on my own journey, I completed my undergraduate studies in mainland China, pursued my master's degree in the U.S., earned a Ph.D., and then worked there for many years. Over time, I have come to realize how critical international collaboration is.

First, fostering global partnerships requires a global mindset. This means being open to working with people who may have different training, academic disciplines, or cultural backgrounds. This is not always easy—especially as we grow older and become more established in our own research areas. We start to develop strong beliefs and feel confident in our own approaches. That is why I promote the idea of maintaining a "plastic mind"—a flexible and patient mindset that allows us to listen to and learn from others, even when their perspectives differ from ours.

As educators, we often talk about cultivating a "reading mind," but to get there, we need to start with a plastic mind. This openness is vital because misinformation thrives on fitting neatly into our existing beliefs and experiences. For example, when I first went to the U.S., there were very few students from mainland China, and most Asian students were from Japan. Today, there are far more students from mainland China than before. However, I notice that many of them still rely heavily on WeChat groups. You can tell that they have not fully integrated, and their sense of connection remains within their own world. After many years, I still see this happening. When I was in New York, I would talk to taxi drivers and ask what kind of music they were listening to. If I happened to be in Chinatown, they were often

listening to Chinese pop songs. I could tell their English was not very strong, and that was evident.

This tendency is true in both the U.S. and China. It is interesting to think about what kind of systems people use on their phones—are they relying on the Chinese, the English, or some entirely different language system? I often encourage students to try using the English system on their phones for a few years while they are studying in the U.S. It is a small step, but it can help them develop a global mindset. It is similar to Karl Marx's journey—he was a German philosopher, but his most significant work was completed in Britain. Why not embrace the idea of becoming a true global citizen with a global mindset?

I was very lucky, and so are you. I grew up bilingual because my parents taught me two languages. And look at all of you—you speak at least two languages. Do you know what that does to your brain? It makes it more plastic, which helps you learn faster and better. I feel lucky, and I think you do too.

Diversity comes from difference, and without it, we stagnate. Our college is somewhat unique at Penn State. We do not send our students and faculty abroad much—not because we do not want to but because it is just rare to happen. Yet, we are the most international college at Penn State. About 80% of our faculty is international, and 95% of our master's students are international. Of the 175 Ph.D. students I mentioned earlier, about 130 to 135 are from mainland China.

This international mix is essential for what we do. We build large language models and systems with people who come from different backgrounds, speak different languages, and bring in fresh ideas from the start. This diversity is crucial for our work.

YS: Securing funding and resources for research can be challenging. What are the key barriers in this regard, and how can institutions and researchers overcome them to sustain innovation and progress?

AT: To be brief, funding typically comes from two sources: government and industry, and both are influenced by shifting priorities. Currently, for example, cybersecurity researchers often have steady funding, but other fields might face more challenges. It all depends on where the focus is at any given time.

BZ: This is an area where I really want to share something. Whenever you do research, think about its social impact. It is not just about personal interest. Yes, your passion is important—it is what keeps you energized and focused on your project. But at the same time, consider the market and social needs. For example, Hong Kong has an aging population. If your research can help with elderly care, or if it addresses issues faced by people with disabilities, the social impact will likely lead to funding opportunities.

When we started the AI Media Center, the university's vice president said we should create a showcase to demonstrate our work. For instance, we recently worked on a sign language project that uses AI to identify four types of sign language in Hong Kong. These different groups of people could not communicate with each other before. Over 250,000 people in Hong Kong and more than 30 million in mainland China are affected by hearing disabilities. AI can help bridge these communication gaps, improving access and interaction. So, how do we get funding for such projects? I am not sure, but we continue trying. We strongly believe that our research will benefit people who need it. If we do not get funding this time, we will keep trying, just as you would keep submitting a paper to an academic journal even after it gets rejected. We never give up.

YS: Based on current trends and challenges, what do you see as the most promising areas for future research in CIS? How should researchers position themselves to lead in these emerging fields?

AT: The key challenge is finding a way to watermark AI-generated content, ensuring the original source is always identifiable. This is a critical issue—policy, technical, and social—and I would love to see researchers focus on this. If I could hire anyone, it would be for this purpose.

BZ: For me, I am still fascinated by the impact of emerging technology on behavior change. What kind of new behaviors will emerge? I have shared this with my students before. I once asked my parents, who are in their late 70s, what kind of new technology had the most significant impact on their lives when they were young. My dad is a professor of Chinese literature, and my mom is also a professor. I thought they would give me an academic answer, but they said, "Electricity."

Electricity was revolutionary. Today, we take it for granted—it is as essential as water or air. Similarly, Wi-Fi is another thing we now expect. If you walk into any building, you expect to have Wi-Fi or data coverage. If it is not there, you feel uncomfortable. This raises a question: What kind of human behavior is being changed by AI today? Imagine a thousand years from now, when people look back at this generation. What will they say about how AI changed us in such a short time?

This is something I find fascinating—the mechanism of technology acceptance and behavior change. Another area I am interested in is the "digital future." What kind of digital futures are we creating? More importantly, we do not share a singular vision of the future. The way people envision the future differs based on their backgrounds and experiences. This is why I am focused on understanding how AI connects with imagination. Imagination is a luxury for humans, something we can only have if we have the resources to think beyond our immediate needs. How can AI influence our imagination, particularly as it relates to the digital future? These are the areas I find particularly exciting.

YS: Thank you both so much for sharing such enlightening and inspiring insights. Now, I would like to open the floor to our audience.

AU: Prof. Tapia, on Monday, you mentioned disaster response, and you brought it up again today. You said something really interesting, "We can find the truth." I think if I were doing language analysis, I would say you are very proud of the disaster response program you designed when you talked about finding the truth. We were thinking about war, and there is no shortage of war in places like the Middle East and Ukraine over the past 20, even 50 years or so. Has there been any initiative that you have worked on or heard of that uses data to find the truth in real-time in such war-torn places? I am thinking especially about what is happening now in Israel and Palestine, which is a huge topic affecting people not only in the U.S. but all around the world. Are there any initiatives aimed at finding truth as you define it or helping people access shared information?

AT: The issue you are raising is a tough one—it is about "complex disasters," where factors like war, natural disasters, and political

influences intersect and interact. In these situations, finding the truth is incredibly challenging because each group affected will have its own version of the truth. Whose truth are you finding? Through my work with the UN and other organizations, I have learned that instead of focusing on "the truth," it can be more feasible to get warring parties to agree to focus on finding safety and on providing verified information on where to access food, water, shelter, and medicine. However, even that can be difficult to achieve in conflict zones.

AU: Thank you, Prof. Tapia. That is very inspiring. I have a question about complexity, which you mentioned earlier. I am also fascinated by crisis and emergency communications. In this semester, I proposed an idea considering all the stakeholders—government, public, communication channels, informations input and output, and so on. But my professor said that I was considering too much; we all know that situations like this are complex and influenced by many factors. However, in research, it might be necessary to separate the most important variables or identify the most critical relationships between them. Otherwise, we might lose focus. So, in a general sense, how can we identify the main variables in a complex research topic or phenomenon?

AT: My advice is to focus on a manageable piece of the problem—do not try to tackle everything at once. Think of this as a lifelong challenge. If you are just starting out, you have years ahead to address bigger, more complex issues. For now, choose a specific, feasible aspect of the problem that you can gather data on. It might be tempting to aim for the most fascinating question, but that is a challenge you can tackle over the course of your career.

AU: I have a follow-up question related to technology and organizational dynamics. When I hear about these issues, the theory of diffusion of innovation comes to mind. Everett Rogers was my dissertation advisor. He introduced this idea that when new technologies come up, there are innovators, early adopters, early majority, late majority, and laggards in an organization. I focus on organizational communication, and last summer, Prof. Hardin asked me what advice organizational communication scholars could give regarding employee communication. Specifically, how can we communicate change effectively? How do we encourage employees to adopt new

technologies in an organization? I am also taking classes in business school that focus on management information systems, and I have noticed that people there approach these questions very differently. We, as communication scholars, would say we need to improve communication with employees—things like leadership exchange, leadership styles, and diffusion of innovation. However, in business schools, they often say the problem is not with people but with the technology itself. They would prefer using something like the Technology Acceptance Model, suggesting that the issue lies in the technology, and it should be modified for easier adoption. For us, the focus is on persuading people to accept the technology. How would you comment on that?

AT: The answer is not simple because it is not just one or the other. If you are a socio-technical scholar, you recognize that both the technology and the people play a role in achieving a manager's goal. The challenge is finding how to make both work together. Some argue that technology needs to adapt to the organization, while others say the organization should adapt to the technology. Neither view is fully correct. The key is to create mechanisms that allow you to assess what you need to achieve and adjust both the technology and the organization at the same time. It is difficult, but that is how it works. It would be fun to watch the debate, though!

AU: Thank you so much for the interesting dialogue. I would like to revisit something from the beginning, particularly your point that information science and communication are closely related. I am really curious about your perspective on the interrelationship between information science and communication, especially in terms of theoretical constructs and methodological paradigms. What do you think about the specific research focuses and research questions that could emerge from this interdisciplinary area? Additionally, I would love to hear your insights and recommendations for Ph.D. students who are seeking to engage in interdisciplinary collaboration between information science and communication, particularly in the development of AI. Thank you so much!

AT: I am not a communication scholar, so others will have to provide a more comprehensive answer. However, I can offer the perspective of someone in information science. For us, the focus is not on

improving public communication but on understanding what people are saying, why they are saying it, and where systems like government response may have failed. For example, analyzing 20,000 posts from X about Hurricane Sandy helps us understand the conversation, but not necessarily how to improve communication. That is where a communication scholar could take over and ask, "How can we improve the way we communicate with the public to prevent harm?" That is where the intersection between information science and communication happens.

BZ: I also encourage communication scholars to think of themselves as equal partners in collaboration. In the beginning, we were thinking, "How can I help information scientists with their research?" But it is important to think of ourselves as equal partners, as we also have unique contributions to offer. If you do not approach the collaboration as an equal, the partnership will not be sustainable. We can only offer so much help once or twice, but if we do not contribute significantly to each other's work, it becomes less effective. Ultimately, we need to find common ground.

Earlier, I mentioned that when doing research, one key element is finding this common ground. I really like the metaphor used in the U.S., where people from different backgrounds were once called a "melting pot." Today, we do not think this is the best metaphor. Instead, we prefer the term "salad bowl." In a salad bowl, each ingredient—whether it is a tomato, cucumber, or radish—remains distinct, but when combined, they create something more vibrant and interesting. Each piece retains its individuality, yet together, they form a more attractive whole.

AT: Let me add one more thought, coming from my "communications ignorant" perspective. Imagine a world without formal news—no radio, TV, or newspapers. In such a scenario, how could we create a system where people can still access trustworthy information about the world, their communities, and the events unfolding around them? From an information science standpoint, we would be focused on building the infrastructure for delivering this information. However, the content itself would be outside our expertise. So, the real question becomes: how do we create a mechanism for distributing news and ensuring its reliability in the absence of a formal news system? This

is an area where communication expertise would be crucial to ensure that the information remains accurate and effective.

AU: You previously mentioned your research on Hurricane Sandy and other crises. I think those crises are regional, affecting certain areas like parts of the U.S. or China. My question is, we have experienced many global crises in the past decade, such as the COVID-19 pandemic, political polarization worldwide, and climate emergencies affecting the entire globe. Do you think these global crises have reshaped the priorities and messages used in interdisciplinary research? If so, in what way?

AT: Yes, absolutely. COVID-19 was the defining event of this century—it reshaped nearly every aspect of our lives, from how we interact to how we travel, work, and learn. It was so vast that it is nearly impossible to study comprehensively. While we can focus on smaller pieces, like how Google searches for cold medicine or coughs might correlate with flu or COVID-19 spikes, the broader challenge is how to study such large-scale crises effectively.

This brings us to the idea of proxy information—looking at adjacent data to understand a phenomenon. For example, AI can help identify these proxies more efficiently than humans can. Instead of just focusing on obvious signals like coughs or tissue boxes, AI can analyze vast amounts of data, like posts on X, and uncover patterns or signals we might not have even thought to look for. The COVID-19 crisis has pushed us to rethink how we use proxy information and has given us new tools and methods for studying global phenomena.

BZ: I would like to quickly add that this pandemic, like other global disasters, has really taught us something about globalization. On the one hand, it shows how globalization works; on the other, it reveals its limitations. There are so many factors that contribute to this. When I studied the response to the epidemic starting in Wuhan and later in the U.S., we saw so many differences in the responses. We were facing the same disaster, but we acted so differently.

In our research on empathy during the pandemic, we looked at how people's empathy changed. We studied how social status and identity affected it. Earlier, we were talking about deep workers, right? We studied why some workers, like small restaurant owners in China, were heavily affected by the pandemic. Some of them had just

borrowed money to renovate their restaurants, but now they could no longer have clients.

This shows how different things can be across countries, not like we used to think. We were discussing who needs news the most—some people, who are not seeking information, rely on friends or social media for their news, trusting that it will come to them automatically. Others go directly to experts or mainstream news.

This pandemic has forced us to rethink some things we previously took for granted, like the idea that the internet would provide a public domain for the improvement of understanding and how the freedom of press and speech would evolve. The reality is, things have become more divided than before. In the U.S., people are becoming more intolerant of other ideologies. Many people have said, "I would not work with someone who holds views from the other party."

This makes us realize how complex the world really is. It is not just about applying globalization to everything, nor is it about reducing everything to a single perspective. The pandemic has given us an opportunity to reexamine our research, rethink how we see each other and the world, and reassess how we live our lives in the coming decade.

披露聲明

本文作者未報告潛在的利益衝突。

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